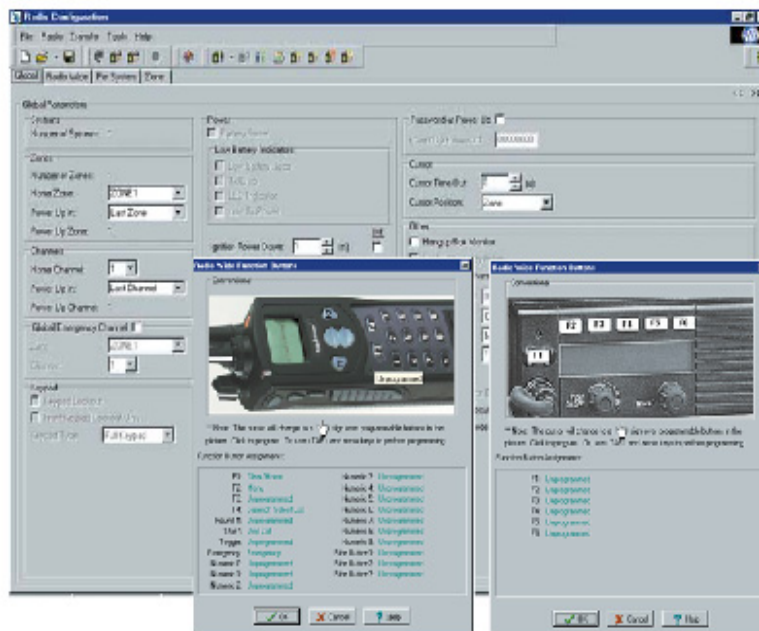




PC Configure™ 2.4.x Programming Software

Programming Manual



- Project 25
 - Conventional
 - Trunked

- SMARTNET® / SmartZone®
- Multi-Net®

EFJohnson[®]

PC Configure[™] Programming Manual

Part Number 002-9998-527240
January 2007

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Information in this manual covers PC Configure version 2.4.x and higher. 5100/5300 Radios with 4.6.x firmware or higher and earlier radios updated to 5.9 file format are supported.

PC Configure Programming Manual

January 2007

EFJohnson[®]

PC Configure[™] Software Programming Manual

January 2007

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List of Fields

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List of Fields (continued)

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Scan List 6-32

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Zones

 Edit Zone 6-30

List of Fields (continued)

Introduction

PC Configure™ Programming Software is used to configure EFJohnson's portable and mobile radios.



CAUTION *PC Configure 2.4.x supports 51xx/53xx/Ascend radios with software 4.6.x or later and earlier model EFJohnson radios that have been updated to 5.9 file format.*

1.1 Computer Requirements

The computer used to run PC Configure must meet the following minimum requirements:

- Microsoft Windows® 98, 2000 or XP
- Intel Pentium® processor or equivalent
- A hard disk drive with at least 4 MB of free space
- A CD-ROM drive
- An available serial port (If your computer does not have an available serial port, EFJohnson recommends using the Keyspan Model USA-19HS Serial-to-USB adaptor.)

1.2 Programming Setup

To program the radios, you need:

- Windows®-based computer
- PC Configure
- The items listed in Sections 1.2.1 through 1.2.4

Figure 1.1 shows the connections you must make to program a portable radio.

Figure 1.1 Portable Radio Programming Connections

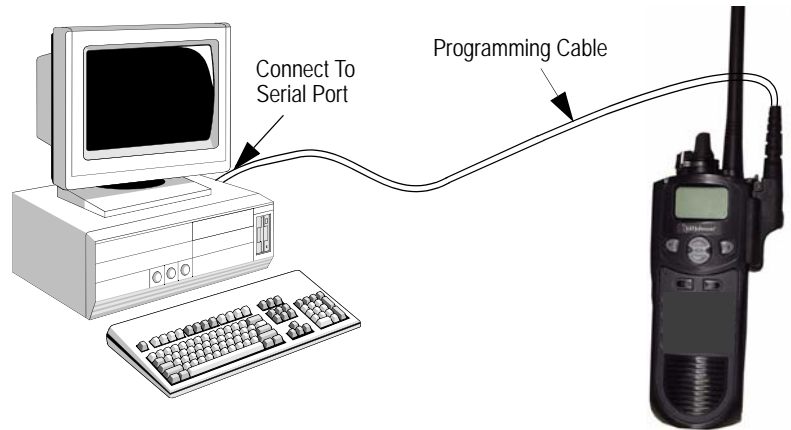
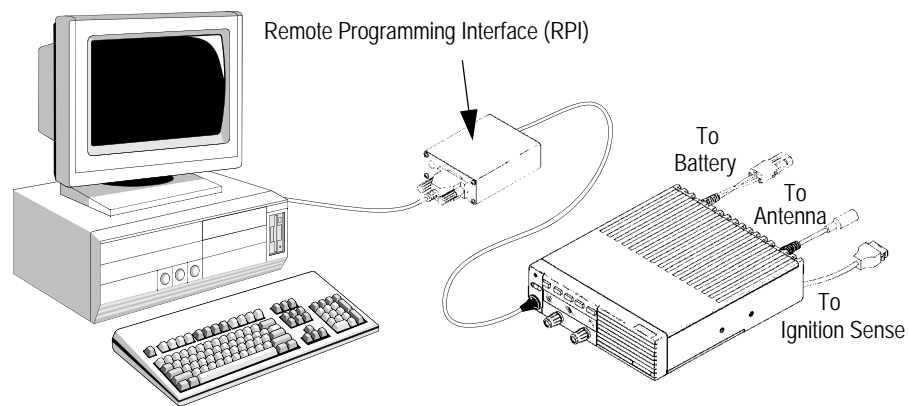


Figure 1.2 shows the connections you must make to program a mobile radio.

Figure 1.2 Mobile Radio Programming Connections



1.2.1 51xx Portable

Programming cable from computer to radio, Part No. 023-5100-920.

Note *This cable, the 023-9998-527 programming software, and the PDF file for this manual are included in Programming Kit, Part No. 250-5100-004.*

1.2.2 53xx Mobile

- Programming cable from RPI to radio, Part No. 023-5300-005.
- Remote Programming Interface (RPI), Part No. 023-5300-000 can be used only in the 5300/53SL, and Ascend transceivers.

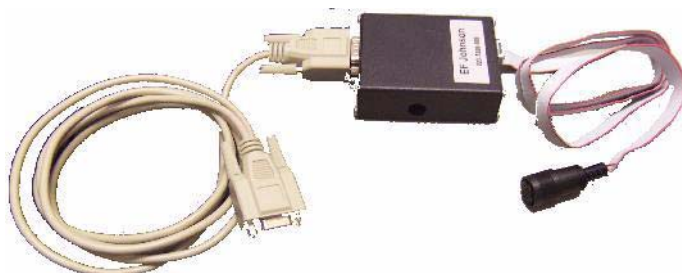
Note *The -005 cable, 5300-000 RPI, 023-9998-527 programming software, and the PDF file for this manual are included in 5300 Programming Kit, Part No. 250-5300-004.*

1.2.3 Connecting Mobile Radios To Computer

The Radio Programming Interface (RPI) provides the required logic interface between the computer and radio. The cable from the RPI to computer is not included with the RPI or in the programming kit. The current RPIs have a female DB9 connector, and most computer serial ports have a male DB9 or DB25 connector. Therefore, a male DB9 to female DB9 or DB25 cable is usually required. This standard cable is available at most computer supply stores or EFJohnson offers a six-foot DB9M to DB9F cable, Part No. 597-5900-002.

Note *With 53xx radios, only RPI, Part No. 023-5300-000, can be used. Other RPIs such as 023-9800-000 and 023-9750-000 are not compatible with this radio.*

Figure 1.3 Radio Programming Interface (RPI) for 5300 Mobile Radios



The cable from the RPI to the radio is not included with the RPI, but it is included in the mobile PC Configure Programming Kit, Part No. 250-5000-004 (for PC Configure 1.x.x) or 250-5300-004 (for PC Configure 2.x.x), or can be ordered separately as previously described..

This cable plugs into the microphone jack of standard front or remote mount radios. With 53xx radios using the Handheld Control Unit (HHC), the connection point is the 10-pin programming jack on the HHC junction box through a special adapter plug (Part No. 023-5300-140). If the HHC is not equipped with the junction box (Part No. 023-5300-130), it is also required for programming.

1.2.4 Connecting Portable Radios To Computer

Note *Although they may look the same, the 5000 portable programming cable cannot be used to program a 5100 portable and vice versa.*

51xx Series - No RPI is required because the radio contains the interface circuitry. The programming cable has a female DB9 connector for connecting to the computer.

Figure 1.4 5100 Portable Programming Cable



1.3 Operating and Service Manuals

This manual includes brief descriptions of the various programmable parameters. For detailed radio operating information, refer to the applicable radio operating or service manuals.

1.4 Software Installation

Note *Before you remove an old version of PC Configure, be sure to transfer the files in the Data and Keys folders to those folders of the new version.*

- 1 Ensure there are no other applications open during this installation procedure. Also, ensure the computer meets the minimum requirements listed in Section 1.1.
- 2 Insert the PC Configure CD-ROM in the CD drive of your computer. Double-click on the PC Configure Application File.

or

In the lower left corner of the screen, select **Start → Run**, then click the **Browse** button. Select the CD-ROM drive and the file *PCConfigure_x_x.exe* (*x_x* is the PC Configure version number). Click the **Open** button and then from the **Run** window, click **OK** and the installation process begins.

- 3 Follow the on-screen instructions. The default directory for the program is *\Program Files\EF Johnson\PCConfigure*. During installation, you can specify a different directory to install the program in if you wish to do so.
- 4 At the Sentinel Protection Installer, select **Next**. Please read and accept the license agreement. Click **Next** and the Set Up screen is displayed. Select **Complete** to finish your installation procedure.

1.5 Starting And Exiting

1.5.1 Starting PC Configure

To start the PC Configure program from Windows, select **Start → Programs → EFJohnson → PCConfigure_2.xx.xx**.

1.5.2 Exiting PC Configure

Select **File → Exit** or click the red **X** in the upper right corner of the screen.

1.6 Programming File Types

Programming data is stored in a disk file that can be saved, read, copied, and deleted. Refer to Section 3.1. This file automatically receives the extension *.rcf*.

1.7 Help Files

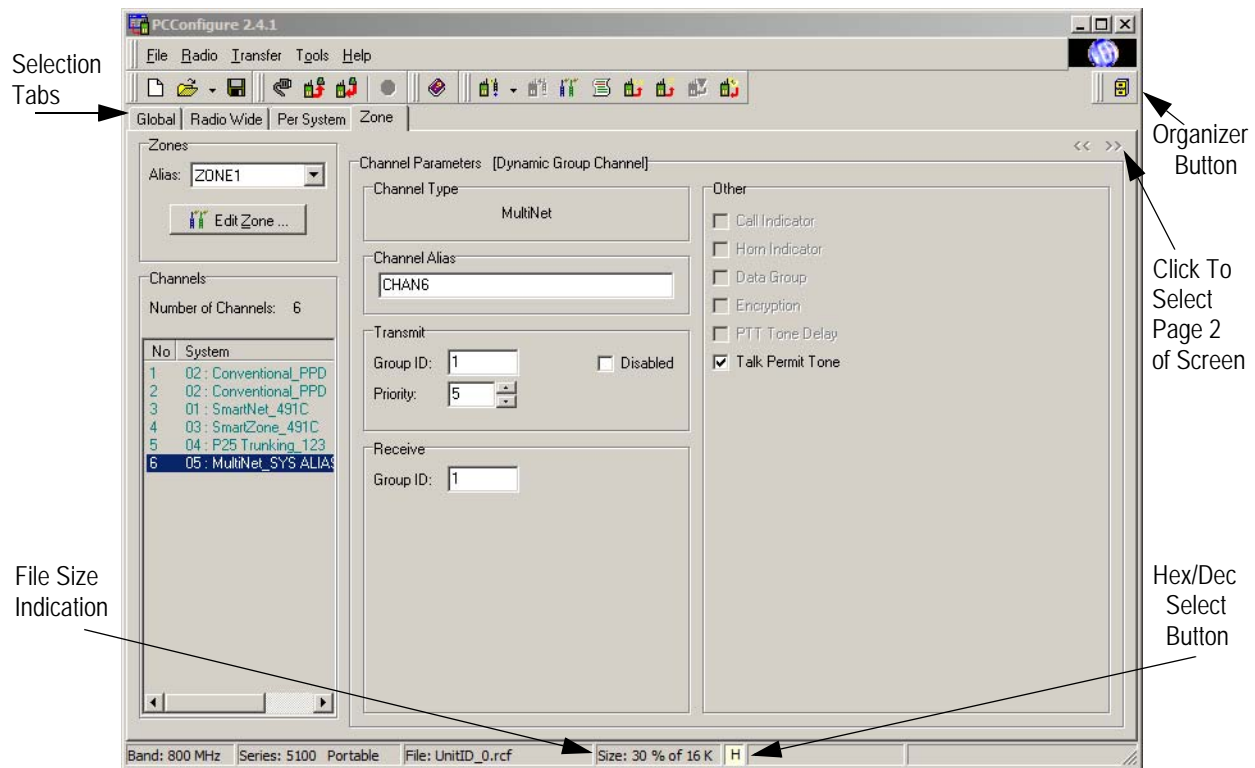
To display Help information on the current screen, click **Help** in the menu bar.

Note *For a list of changes made with the various releases of this software, refer to the ReleaseNotes.txt file in the PC Configure program files folder.*

1.8 Main Screens

From the tabs at the top of the main screen (see Figure 1.5), you can access four different screens: Global, Radio Wide, Per System, and Zone.

Figure 1.5 Main Screen (Global Screen shown)



The functions of these screens are as follows:

Global - This screen programs parameters that are the same for all Conventional, Project 25 Trunked, SMARTNET™, SmartZone®, and Multi-Net systems. Refer to Section 4 for more information on parameters in this screen.

Radio Wide - This screen programs the parameters that are the same for all programmed Conventional (Project 25 and analog), Project 25 trunked, SMARTNET/SmartZone, and Multi-Net systems (a different screen is displayed for each). The screen's system type is selected in the **System Specific** pane. Refer to Section 5.1 (Conventional systems), Section 6.1 (SMARTNET/SmartZone), Section 7.1 (Project 25 trunked), or Section 8.1 (Multi-Net) for more information on parameters in this screen.

Per System - This screen programs the parameters that are unique to each programmed system. Select the system you want to edit by clicking it in the **Systems** box. Refer to Sections 5.2, 6.2, 7.2 or 8.2 for more information on parameters in this screen.

Zone - This screen programs the channels and zones. Unique channel parameters include system number and type, frequency, and talk group. Refer to Section 5.3, 6.3, 7.3 or 8.3 for more information on parameters in this screen.

1.9 Other Screen Information

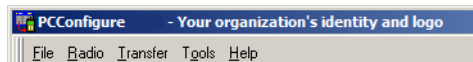
This section describes the items that appear on the PC Configure main screen:

- Programmable title and logo
- Organizer
- File size indication
- Decimal/Hexadecimal select


1.9.1 Programmable Title and Logo

You can enter text to customize the title that is displayed at the top of the screen. Refer to Figure 1.6. Use the **Tools → Organization Identity** menu item to program the title. For example, use this to display a company name on the top line. In addition, you can customize the logo that is displayed on the right end of the menu bar. Refer to Section 3.4 for more information.

Figure 1.6 Programmable Title Bar



1.9.2 Organizer

Click the organizer button  on the right end of the toolbar to display the screen used to organize various programming files into groups and subgroups. The Organizer makes it easier to administer the programming files of a large organization. Refer to Section 3.8 for more information.

1.9.3 File Size Indication

The maximum number of channels you can program may be limited by the available memory space in the radio. Figure 1.5 shows the **Size:** box in the status bar on the bottom of the screen that displays a running indication of the amount of memory used by the current data if it was downloaded to the radio. The **Size:** box displays this as a percentage. Please watch this percentage during the programming. When the percentage reaches 95%,

you may have to delete some channels if more information remains to be programmed. When this percentage reaches 100%, the available memory is full.

1.9.4 Decimal/Hexadecimal Select

On some screens, such as the **SMARTNET Talk Group**, you can enter numbers using either a decimal or hexadecimal format. The format effects all settings. This means that when you select a decimal/hexadecimal format, that format effects all applicable numbers on all screens (except System ID /WACN ID which are fixed as hexadecimal numbers). Decimal or hexadecimal format may be changed during programming.

Note *Decimal mode is preferred for Ascend radio programming. Hexadecimal mode entry is allowed for site list channels and group ID values.*

The currently selected format is indicated in the status bar on the bottom of the screen in the box next to the file size indication. Refer to Figure 1.5. A “D” indicates the decimal format is selected, and an “H” indicates the hexadecimal format is selected. The background color indicates the number type. The color is ivory for hexadecimal numbers, and white for decimal and other entries.



To toggle between the decimal and hexadecimal formats, right click the **H/D** box and click “Yes” in the confirmation box that appears. This mode can also be toggled using the **Tools → Preferences** screen described in Section 3.4.

1.10 Creating Systems

Note *To view the current and added systems, select the **Per System** tab and all programmed systems appear in the **Systems** pane on the left side.*

A system as used with these radios is a collection of channels or talk groups typically assigned to the same repeater site. The **Per System** screen shows unique system parameters, including the scan list, various timers, and talk groups. You can create up to sixteen systems of any type.

To create a new Conventional, SMARTNET, SmartZone, Project 25 Trunked, or Multi-Net system, select **Radio → Add Systems** in the menu bar and then select the desired system type. Refer to Section 3.2.

Another way to create a system is to click  in the toolbar and select the desired system type from the drop-down list. To delete a system, select it in the **Systems** box and then select the **Radio → Delete System** in the menu bar or  in the toolbar.

1.11 Safeguards to Prevent Downloading Wrong Code Version

Note *The following applies only to downloading application code (firmware), not to downloading standard personality information.*

PC Configure software, Version 2.4.x includes safeguards to prevent downloading an incorrect firmware version. PC Configure 2.4.x supports 51xx/53xx radios with software 4.6.x or later and earlier radios that have been updated to 5.9 file format.

Programming Procedure

This section describes the general procedure you follow to program a radio.

- Getting started
- Creating systems
- Entering Global parameters
- Entering Radio Wide parameters
- Setting up Zones and Channels
- Entering conventional system and channel parameters
- Entering SMARTNET/SmartZone system and channel parameters
- Entering Project 25 trunked system and channel parameters
- Entering Multi-Net system and channel parameters
- Programming the radio (writing the file)

2.1 Getting Started

Select a programming file as follows:

Create a New File

- 1 To start with a new file containing default parameters, select **File → New**.
- 2 When the dialog box appears, select the frequency band of the radio:

VHF (136-174 MHz)
UHF 380 (380-470 MHz)
UHF Low (403-470 MHz)
UHF High (450-512 MHz)
700/800 MHz (762-870 MHz)
800 MHz (806-870 MHz)
900 MHz (896-940)


Note *Multi-Net operation is available with 800 MHz, 700/800 Hz and 900 MHz models.*

Open An Existing File - To open an existing file stored on disk, select **File → Open** and the name of the file that you want to open.

Read a File From a Radio

- 1 To transfer a file from a radio to the computer for editing or use as a basis to program another radio, connect the radio to the computer as described in Section 1.2.
- 2 Turn the radio on and select **Transfer → Read Parameters From Radio** in the menu bar. For security reasons you cannot upload encryption parameters. Refer to Section 3.3 for more information.


2.2 Creating Systems

When you create a new programming file, PC Configure automatically sets up a conventional system. Select **Radio → Add System** or click the  icon in the toolbar to create the desired number and type of Conventional, SMARTNET, SmartZone, Project 25 Trunked and/or Multi-Net systems. Refer to Section 1.10 for more information.

Note *The **Per System** screen must be selected to view the current systems.*

2.3 Entering Global Parameters

- 1 Click the **Global** tab at the top of the screen to display the **Global** Parameter screen.
- 2 Program the applicable parameters in this screen. Parameters that do not apply to the selected radio series are grayed out. See Section 4 for additional information on these parameters.

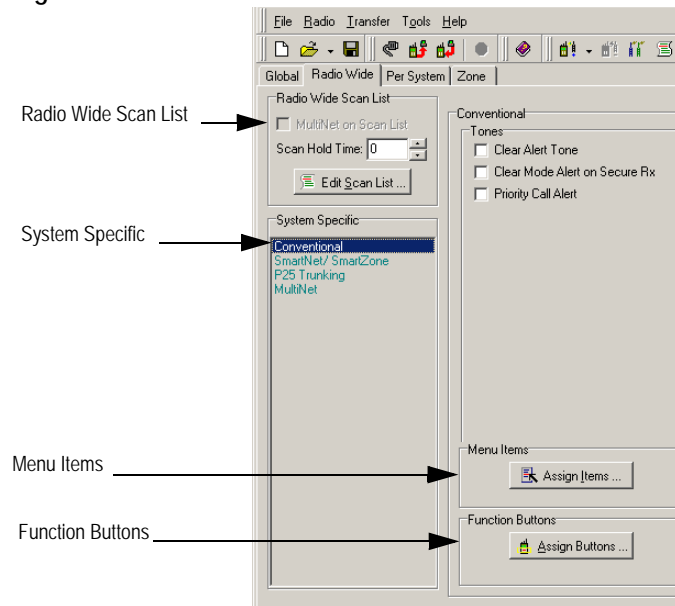
When a screen has a second page, use the double arrows, , on the right side of the screen to navigate between the initial screen and the second screen.

Note *The Global Parameters screen is applicable to all protocols. The **Radio Wide**, **Per System**, and **Zone/Channels** screens are system-specific screens. Please note that the terms “protocol” and “system” mean Conventional, SmartNet/SmartZone, P25 Trunking, and Multi-Net.*

2.4 Entering Radio Wide Parameters

- 1 Display the **Radio Wide** screen by clicking the **Radio Wide** tab at the top of the screen. The **Radio Wide** screen contains four areas that appear regardless of which type of system you program.

Figure 2.1 Radio Wide Screen Common Fields



- 2 When you click any of the buttons, PC Configure opens a screen that enables you to program a corresponding set of parameters. Select the protocol (or system) that you wish to program in the left pane, labeled System Specific. The protocols listed in the System Specific screen are those systems that have added (refer to Section 1.10). A screen with parameters to be programmed for the specified system/protocol is displayed.
- 3 Program the applicable parameters for all Conventional, SMARTNET/SmartZone, Project 25 Trunked and/or Multi-Net systems as described in the section for each respective system.

Note You cannot program the Radio Wide Scan List until the channels are set up as described in Section 2.5, “Setting Up Zones and Channels”. Please refer to Section 9, “Programming Scanning” for additional information.

2.4.1 Radio Wide Scan List Programming

Scan Hold Time - When the radio performs Radio Wide scanning, this programs the delay that occurs after the radio stops receiving and transmitting messages. You can program times of 0 - 7.5 seconds.




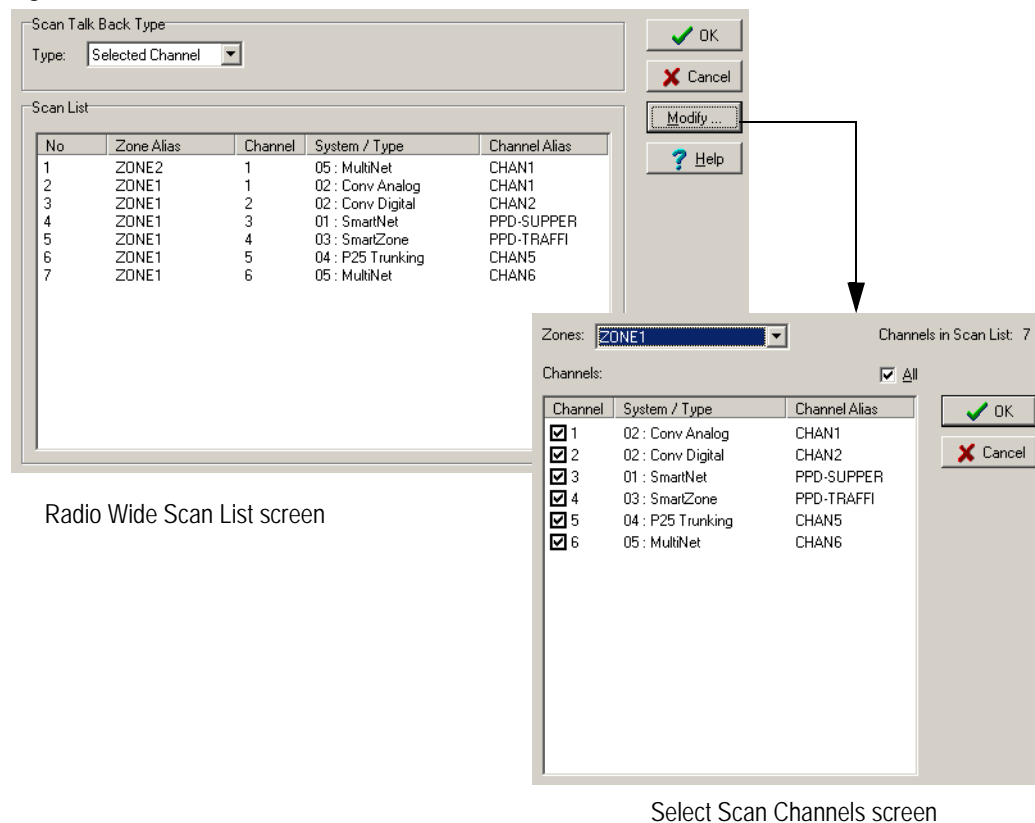
Edit Scan List - You cannot program the radio wide scan list until you have set up all channels to be included in it in the *Zone* screens, as described in the *Setting Up Zones* section for each system. The **Radio Wide Scan List** is the same for all system types and can include up to sixteen channels from any system. You program this scan list by clicking the  button on this screen or  in the toolbar. When you click either of these buttons, PC Configure displays the screens shown in Figure 2.2. To select the channels that are in the radio wide scan list, click the  button to display the **Select Scan Channels** screen. Select the desired zones from the drop-down list and then check the channels that you want to include from each zone in the list.

Figure 2.2 Radio Wide Scan List Screens



2.4.2 Menu Items Programming


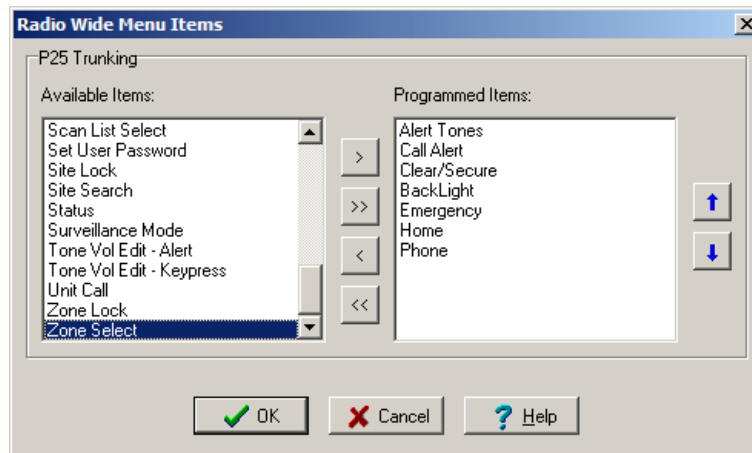
You can assign menu items when you program 5100/5300 radios. To allow the radio user to use the menu mode, you must select the “Menu Enabled” box on the **Global** screen. Clicking the  button on the Radio Wide screen displays the Radio Wide Menu Items shown in Figure 2.3. From this screen, choose the functions the radio user can select in the menu mode. To move any item from the **Available Items:** list to the **Programmed Items:** list--or *vice versa*--double-click the item or select it and click one of the single arrow buttons. Clicking a double arrow button moves all items in one list to the other list.

Figure 2.3 Radio Wide Menu Items Screen



You can program a separate set of menu parameters for each system type using a process similar to the one described for function buttons in Section 2.4.3. Select the system type that you want to program in the **Radio Wide** screen’s “System Specific” box. The radio user can control functions by both the menu and a function button. Table 2.1 shows the available menu functions.

2.4.3 Function Button Programming


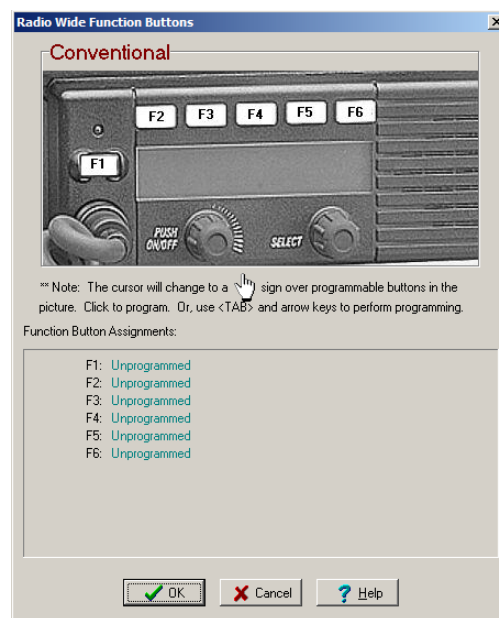
Click the  icon in the **Radio Wide** screen to display a screen similar to the one shown in Figure 2.4. Use this screen to program the function buttons for the radio series you chose in **Radio → Series**.

Figure 2.4 Radio Wide Function Buttons (5100 Portable)

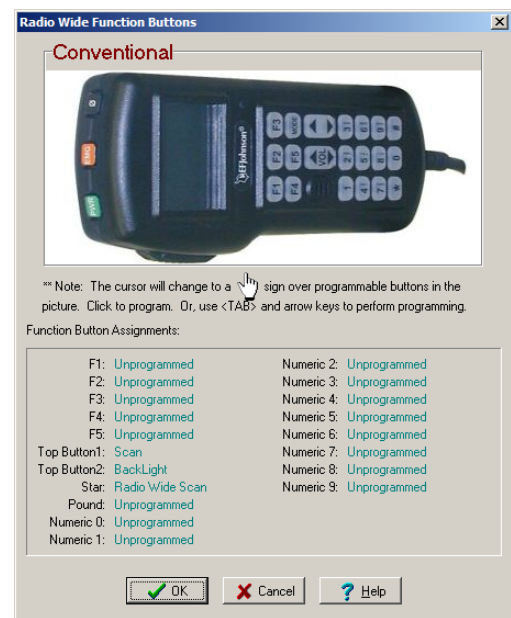


5100 Series

Figure 2.5 Radio Wide Function Buttons (5300 Mobile)



5300 Series (Normal Controller)



5300 Series (Handheld Controller)

Function buttons are programmed per protocol and may have different functions depending on the protocol. Select a protocol in the **Radio Wide** screen's "System Specific" list, then click **Assign Buttons**. Available Menu and Options Buttons selections are listed in Table 2.1.

Note To view the functions programmed for each button in the various modes, select **Radio → View Programmed Radio Wide Functions**. Refer to Section 3.2.

Table 2.1 51xx/53xx Programmable Option Button and Menu Mode Functions

Function	X = Available in Mode:				Menu Display
	Conventional	Project 25 Trk	SMARTNET	SmartZone	
Alert tones On-Off	X	X	X	X	Tones
Backlight On-Off (51xx), Hi/Med/Off (53xx)	X	X	X	X	Backlight
Call Alert Select (Paging)	X	X	X	X	Call Alert
Call Response Select		X	X	X	Call Rsp
Cancel Dynamic Regroup		X	X	X	Cancel DR
Change Keypad (OTAR)	X	X	X	X	Chg Keypad
Channel Select	X	X	X	X	Chan Selct
Clear/Secure Encryption Select	X	X	X	X	Security
Clone Programming Select (51xx menu only)	X	X	X	X	Clone
Contrast (51xx only)	X	X	X	X	Contrast
Digital (Project 25) Talk Group Select	X				Select TG
Display GPS (53xx only)	X				-
Display Information Select (frequency or channel display)	X				Display
Emergency Mode Select	X	X	X	X	Emergency
Erase Keys, OTAR (menu only with 51xx/53xx)	X	X	X	X	Erase Keys
External Public Address (53xx only)	X	X	X	X	
High/Low Power Select	X	X	X	X	Tx Power
Home Zone Select	X	X	X	X	Home Zone
Home 2	X	X	X	X	
Horn Honk Select (53xx only)	X	X	X	X	
Key Select, OTAR	X	X			Key Select
Keypad Lock Select (51xx only)	X	X	X	X	(Opt sw only)
Keypad Programming Select	X				Keypad Prg
Messaging Select	X		X	X	Message
Monitor Mode Select	X				Monitor
Mute/Unmute	X	X	X	X	

Table 2.1 51xx/53xx Programmable Option Button and Menu Mode Functions (continued)

Function	X = Available in Mode:				Menu Display
	Conventional	Project 25 Trk	SMARTNET	SmartZone	
Normal/Selective Squelch Select	X				Squelch
P25 Packet Data	X	X			Data Modes
Phone Call Select	X	X	X	X	Phone
Priority Channel Select	X				Priority
Private Call Select			X	X	Priv Call
Radio Wide Scan Select	X	X	X	X	RW Scan
Rekey Request	X	X			Rekey Request
Remote Access (Pyramid Repeater) (53xx only)	X	X	X	X	
Repeater Talk-Around Select	X				Talk Arnd
Request to Talk	X				
RWS List Edit	X	X	X	X	RWS Edit
Scan Mode Select	X	X	X	X	Scan
Scan List Edit Select	X	X	X	X	Scan Edit
Scan List Select	X (5100 only)	X	X	X	Scan Selct
Set User Password	X	X	X	X	Set Paswd
Squelch (Code) Select List	X				Sqlich Code
Single Tone Encoder (51xx only)	X				Tone Enchr
Site Lock Select		X		X	Site Lock
Site Search Select		X		X	Site Srch
Status Select	X	X	X	X	Status
Surveillance Mode Select	X	X	X	X	Surv Mode
Tone Volume Edit - Alert	X	X	X	X	numbers that can be adjusted
Tone Volume Edit - Keypad	X	X	X	X	numbers that can be adjusted
Unit Call Select	X	X			Unit Call
Unprogrammed (<i>Note The button is not used.</i>)	X	X	X	X	
Volume Down (51xx only)	X	X	X	X	(Opt sw only)
Volume Up (51xx only)	X	X	X	X	(Opt sw only)
Zone Select	X	X	X	X	
					Tones

Available Menu and Options Buttons selections for Multi-Net are listed in Table 2.2.


Table 2.2 Multi-Net Mode Option Switch and Menu Functions

Function	Menu Display	Option Switch
Alert Tones Toggle	Tones	X
Backlight On-Off	Backlight	X
Call Response	Call Rsp	X
Change Keypad (OTAR)	Chg Keypad	X
Channel Select	Chan Selct	X
Contrast (51xx only)	Contrast	X
Emergency Select	Emergency	X
Erase Keys	Erase Keys	X
External Public Address (53xx only)	Externl PA	X
Favorite Channels	Favorites	X
Group Scan Select	Grp Scan	X
High/Low Power Select	Tx Power	X
Home Zone Select	Home Zone	X
Home 2 Zone Select	Home 2	X
Horn Honk (53xx only)	Horn Honk	X
Keypad Lockout Select (51xx only)	Lock Kypad	X
Mute Unmute audio	Audio Mute	X
Phone Call Select	Phone	X
Radio Info Display	Radio Info	X
Radio Wide Scan Select	RW Scan	X
RWS List Edit	RWS Edit	X
Scan List Edit	Scan Edit	X
Scan List Select	Scan Selct	X
Set User Password	Set Pswd	X
Site Lock	Site Lock	X
Site Search Select	Site Srch	X
Status Select	Status	X
Surveillance Mode Sel	Surv Mode	X
Tone Volume Edit - Alert	Alert Vol	X
Tone Volume Edit - Keypress	Keyprs Vol	
Unit Call Select	Priv Call	X
Unprogrammed	-	-
Volume Down (51xx only)	(Opt sw only)	X
Volume Up (51xx only)	(Opt sw only)	X
Zone Lock (51xx only)	Zone Lock	X
Zone Select	Zone Selct	X

Program the function buttons as follows:

- 1 Click the white <Fx> button that you want to program in the photo. A drop-down menu displays that shows the functions you can assign.

Tip *You can program almost all the 51xx portable's buttons.*

- 2 To select a function, double click it in the drop-down list. The functions assigned to each button appear in the bottom part of the screen.
- 3 Repeat Steps 1 and 2 for all function buttons that you want to program. Next, click **OK** to exit and save the changes or **Cancel** to exit without saving the changes.
- 4 You may want the function buttons to perform different functions when the radio operates in other modes. To accomplish this, do the following:
 - a Select one of the other modes in the **Radio Wide → System Specific** box.
 - b Click  in the **Radio Wide** screen to display a screen similar to the one shown in Figure 2.4.
 - c Repeat Steps 1 through 3 for each mode that you want to assign unique function buttons to.

2.5 Setting Up Zones and Channels

- 1 Display the **Zone** screen by clicking the **Zone** tab at the top of the screen.
- 2 Set up Zones and Channels as described in Section 5.3, 6.3 and 7.3. Zones can include up to 16 channels of any type from any system.

2.6 Entering Conventional System and Channel Parameters

Note *If no conventional channels are programmed, proceed to Section 2.7.*

- 1 Display the system programming screen by clicking the **Per System** tab at the top of the screen.
- 2 Select the protocol in the left pane and program the applicable parameters for each Conventional system as described in Section 5.3.3.

Note *You may have to define the channels further as described in the next steps before programming the standard scan lists.*

- 3 Display the **Zone** screen by clicking the **Zone** tab at the top of the screen. Program the individual channel information of each Conventional channel in each zone as described in Section 5.3.3.

- 4 If necessary, program the priority scan lists in each system (preceding Step 2). After you have programmed all channel information, program the Radio Wide scan list in the **Radio Wide** screen. Refer to Section 2.4.

2.7 Entering SMARTNET/SmartZone System and Channel Parameters

Note *If no SMARTNET or SmartZone channels are programmed, proceed to Section 2.8.*

- 1 Display the system programming screen by clicking the **Per System** tab at the top of the screen. Make sure the correct System Key is selected as described in Section 13.
- 2 Select the system in the left pane and program the applicable parameters for each SMARTNET and SmartZone system as described in Section 6.2.1.

Note *You may have to define the channels further as described in the next steps before programming the various system lists.*

- 3 Display the **Zone** screen by clicking the **Zone** tab at the top of the screen. Program the individual channel information of each SMARTNET and SmartZone channel in each zone as described in Section 6.3.3.
- 4 If necessary, program the system lists (preceding Step 2). After you have programmed all channel information, program the Radio Wide Scan List in the **Radio Wide** screen. Refer to Section 2.4.

2.8 Entering Project 25 Trunked System and Channel Parameters

Note *If no Project 25 Trunked channels are programmed, proceed to Section 2.10.*

- 1 Display the system programming screen by clicking the **Per System** tab at the top of the screen. Make sure the correct system key is selected as described in Section 13.
- 2 Select the system in the left pane and program the applicable parameters for each Project 25 Trunked system as described in Section 7.2.1.

Note *You may have to define the channels further as described in the next steps before programming the priority scan lists.*

- 3 Display the **Zone** screen by clicking the **Zone** tab at the top of the screen. Program the individual channel information of each Project 25 Trunked channel in each zone as described in Section 7.3.3.

- 4 If necessary, program the priority scan lists in each system (preceding Step 2). After all channel information is programmed, program the Radio Wide scan list in the **Radio Wide** screen. Refer to Section 2.4.

2.9 Entering Multi-Net System and Channel Parameters

- 1 Display the system programming screen by clicking the **Per System** tab at the top of the screen.
- 2 Select the system in the left pane and program the applicable parameters for each Multi-Net system as described in Section 8.2.1.

Note *It may be necessary to further define the channels as described in the next steps before programming the group scan lists.*

- 3 Display the **Zone** screen by clicking the **Zone** tab at the top of the screen. Program the individual channel information of each Multi-Net channel in each zone as described in Section 8.3.3.
- 4 If necessary, program the group scan lists in each system (see preceding step 2). After all channel information is programmed, program the Radio Wide scan list in the **Radio Wide** screen (see Section 2.4).

2.10 Programming the Radio (Writing the File)

After you enter all the required programming information in the various programming screens, you can write the information to the radio: This step is also called “downloading”. When writing a file, ensure that you have done the following:

- Secured all connections between the computer and radio
- Turned the radio on
- Selected the proper serial port (Refer to Section 3.3.)

Then proceed as follows:

- 1 Select **Transfer → Write Parameters To Radio** from the menu bar.
- 2 If no file is currently loaded, a dialog box appears to select the desired file. Otherwise, the current file is transferred to the radio.

Menus and Tools

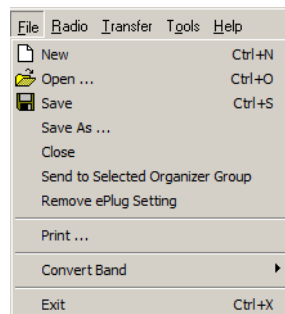
This section describes the controls you find in the following PC Configure navigation tools:

- File menu
- Radio menu
- Transfer menu
- Tools menu
- Help menu
- Toolbar
- Status bar
- Organizer

3.1 File Menu

Figure 3.1 shows the **File** menu.

Figure 3.1 File Menu



New - Creates a new programming file named *untitled.rcf* containing default parameters. Also displays a dialog box for selecting the frequency range.

Open - Opens a programming file that was previously saved to disk. If a modified file is open, PC Configure asks you if you want to save that file before the new file is opened.

Save - Saves the current file to disk using the current file name. If it is the first time a new file is being saved, the following **Save As** screen displays to specify the file name and destination.

Note *You cannot save any type of new programming file to disk without a radio connected. Refer to Section 15.1 for more information.*

Save As - Saves the current file to disk and displays a screen for selecting a file name and destination if desired. The default file name is the Project 25 Unit ID in the format *UnitID_xx*.

Close - Closes the current file without exiting the program so you can open or create another file. If you modified the current file but did not save your changes, PC Configure asks you if you want to save your changes before closing.

Send to Selected Organizer Group - Adds the current file to the group that you select in the organizer. Refer to Section 3.8 for more information.

Print - Prints the information in the current file. A screen displays to select if **Global**, **Radio Wide**, **Per System**, or **Zone** information is printed.

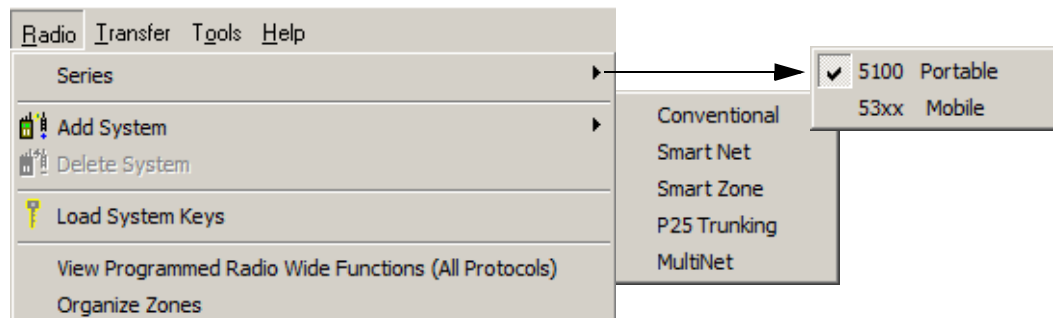
Convert Band - If the current file type is UHF 380 (selected when you create it by **File → New**), you can use this to change it to UHF LO type and *vice versa*. Also, you can use this command to convert an 800 MHz file to 700/800 MHz and *vice versa*. If some frequencies are out of the new band, the conversion will not be completed. A text box opens and displays the out-of-range channels in a zone/channel list.

Exit - Closes the PC Configure program. If you modified the current file but did not save your changes, PC Configure asks you if you want to save your changes before closing.

3.2 Radio Menu

Figure 3.2 shows the **Radio** menu.

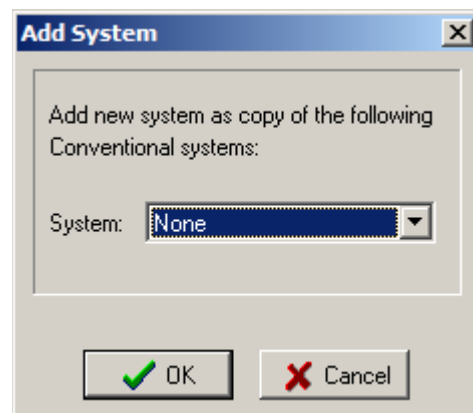
Figure 3.2 Radio Menu



Series - Selects the specific type of radio to program. You can then select only parameters that apply to that radio. Other parameters are grayed-out.

Add System - Adds a new Conventional, SMARTNET, SmartZone, or Project 25 Trunking system as described in Section 1.10. Multi-Net is available with Ascend/55xx Mobile and Portable models. Select the system you wish to add. A pop-up menu is displayed allowing you to select a system on which to model the new.

Figure 3.3 Add System Screen



Delete System - When you set-up two or more systems, this function deletes the system selected in the **Per System** screen.

Load System Keys - Allows the system keys to be loaded from a folder other than the default *Keys* folder. A dialog box displays to let you select the desired folder. Refer to Section 13 and “Preferences” in Section 3.4 for more information. After you have loaded the key from the *Keys* folder, proceed to the **Per System** tab and select the desired system. In the *IDs* System drop-down box, select the .key file. (Please refer to the **Per System** Initial screen in Sections 6 and 7.)

View Programmed Radio Wide Functions (All Protocols) - Displays the screen shown below that indicates the functions you assigned to the programmable option buttons on the **Radio Wide** screen. Refer to Section 2.4.3. You can program these buttons for a different function in each protocol (conventional, SMARTNET, SmartZone, Project 25 Trunked, Multi-Net). The screen displays a maximum of two modes selected by the drop-down lists.

Figure 3.4 Radio Wide Programmed Functions Screen

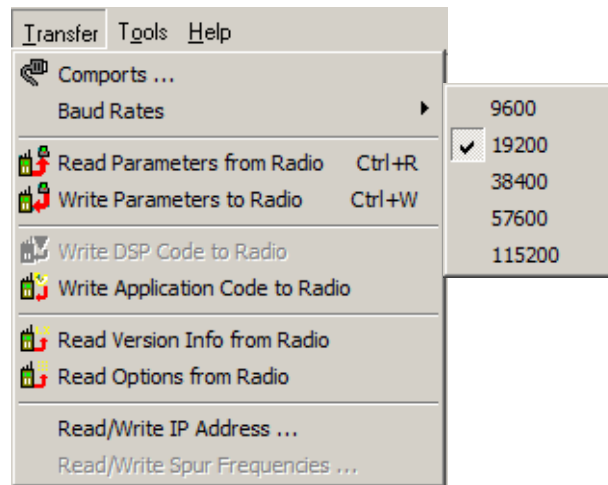
Protocol	F1	F2	F3	F4	Pound #	Star #	Toggle	Emergency	Numeric 0	Numeric 1	Numeric 2	Numeric 3	Numeric 4	Numeric 5	Numeric 6	Numeric 7	Numeric 8	Numeric 9	Side Button 1	Side Button 2	Side Button 3
Conventional	Clear/Home	Menu	Unprogrammed	Scan List Select	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Scan	BackLight	Radio Wide Scan
SmartNet / SmartZone	Clear/Home	Menu	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Unprogrammed	Scan	BackLight	Radio Wide Scan


Organize Zones - Zones are programmed by protocols. The position of the zones in the list can be changed by highlighting the zone and clicking the up/down arrows beside the list.

3.3 Transfer Menu

Figure 3.5 shows the **Transfer** menu.

Figure 3.5 Transfer Menu



Note To stop a data transfer in progress, click  in the toolbar. Refer to Section 3.6.

Comports... - Displays a dialog box in which you can select the communication port used to program the radio. Refer to Section 1.2. The default is COM1. PC Configure saves the last selected port, then automatically selects it again whenever someone starts the program. At startup, PC Configure looks at the available communication ports and highlights the available ports from which you may select your comport. Refer to “Preferences” in Section 3.4 for more information.

Baud Rates - Select the following baud rates for the specific download procedure desired:

RCF download = 19200

Application download = 115200

Read Parameters from Radio - Transfers the information programmed in the radio connected to the computer into a new programming file. If you have not saved the current file when you select this function, PC Configure displays a dialog box that asks whether you want to save it. You can view, edit, or save the transferred data to a disk file. You may have to enter an upload password. Refer to Section 10 for more information.

Write Parameters to Radio - Programs the radio connected to the computer with the data in the current programming file. You may have to enter a password. Refer to Section 10 for more information.

Write Application Code to Radio - Programs application code upgrades to 5100/5300 radios.

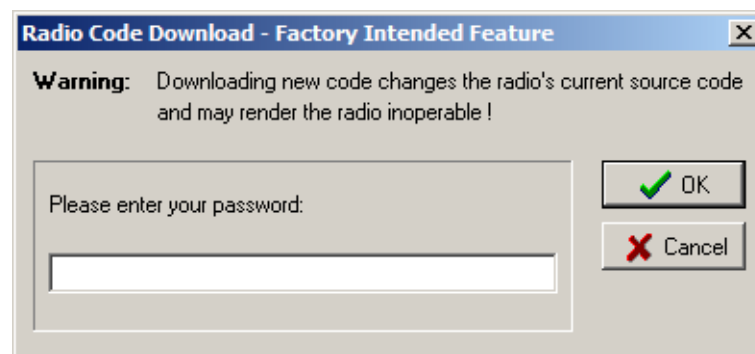
Proceed as follows:

- 1 Obtain from EFJohnson a special computer file containing the new application code. The application code has a *.hex* extension. Copy the 5100 specific *.hex* file to the PPC/5100 subfolder under the main PC Configure folder. Copy the 53xx specific *.hex* file to the PPC/5300 subfolder under the main PC Configure folder. These are default locations for storing application upgrade files.
- 2 Put the radio in the firmware programming mode as follows.
53xx/Ascend - Turn power on with the special Flash Mode Select Plug, Part No. 023-5300-010, plugged into the microphone jack. Another way to do this is to short Pin 3 to Pin 7. With the HHC, plug it into the programming adapter plug (023-5300-140) that is plugged into the junction box programming connector. The 5300 radio will display Control Head version number when programming mode has been entered (for example: "3.17.x").
51xx/Ascend - Turn power on with the "3rd" side button depressed. The radio will display "Bootload Waiting for serial bus command" when programming mode has been entered.
- 3 Baud rates for the "Parameter" or ".rcf" download should be set to 19200 and the "flash" or "application" download should be set to 115200.
- 4 Ensure the radio is connected to the computer, then select this function. Enter the password (obtained from EFJohnson) in the screen that displays and click the **OK** button.

Note *An error box will alert you if a radio contains a Flash Code that is not supported by this version of PC Configure. You may need to update the boot loader code as well as the application code. Update the boot code first. You select the Boot Loader utility by one password and the application utility by another.*

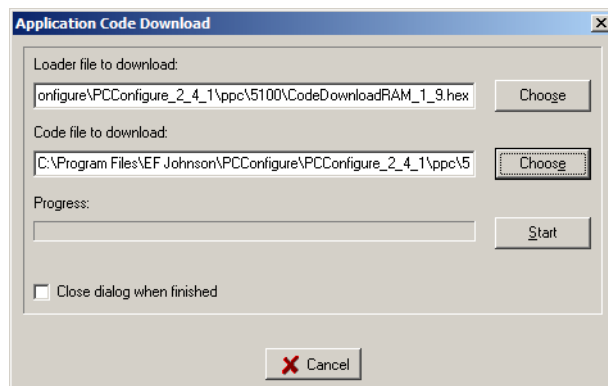
- 5 The Radio Code Download screen is displayed. Enter your password and press **OK**.

Figure 3.6 Radio Code Download Screen



The following screen is displayed. Select the loader and code files if required by clicking the **Choose** button. The PC Configure software includes the loader file. If you need an updated loader file, select the updated file instead of the included loader file. The application code file should be in the folder you selected in Step 1. Click the **Choose** button and select the desired file.

Figure 3.7 Code Download Screen

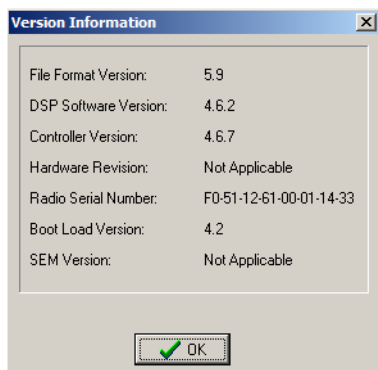


- 6 Click the **Start** button to begin code download process. If a communication failure occurs, verify that the proper Application Code and Loader Code were selected (Figure 3.7). Re-initialize the radio's programming mode and click **Start** again. The Application Download Process requires approximately 15 minutes to complete.

Note After downloading is complete, perform **Read Parameters from Radio** and then **Write Parameters to Radio** to ensure the file format is correct.

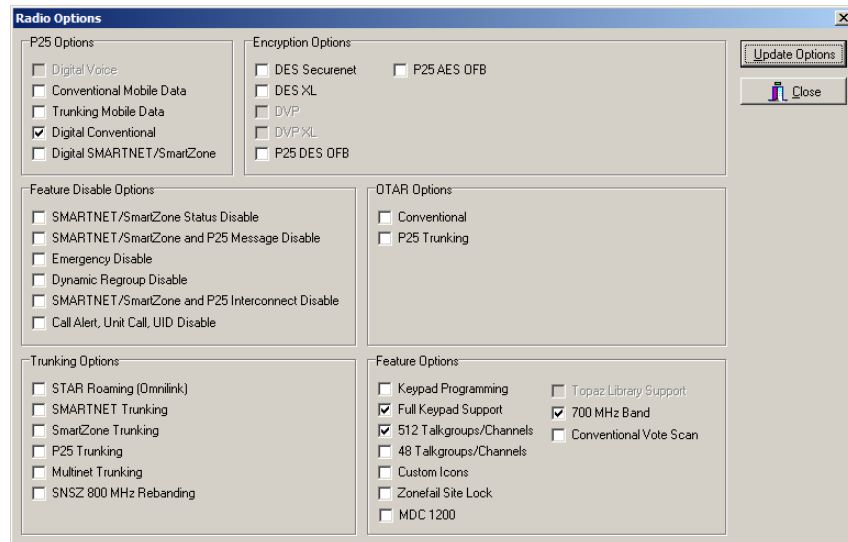
Read Version Info from Radio - Transfers version information on the software the radio contains and then displays it as shown below. The SEM version will be Not Available if there are no Encryption options enabled in the radio.

Figure 3.8 Version Information Screen



Read Options from Radio - Displays information about the options enabled in the radio (Figure 3.9). The check boxes indicate which options are enabled. They are for informational purposes only and cannot be edited.

Figure 3.9 Transfer → Read Options Screen

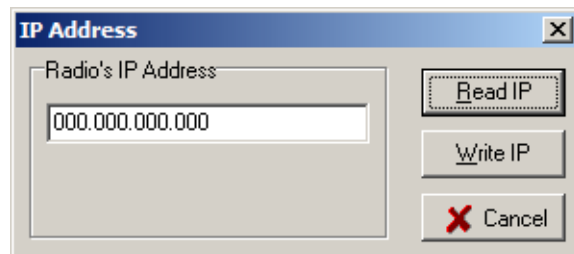


Note To enable additional options, please contact EFJohnson Customer Service. A file from the factory is required to enable additional options.

Use the **Update Options** button to add additional options that were purchased for the radio. A data file keyed to the radio's Electronic Serial Number (ESN) unlocks these options. This file has an .opt extension. When you click this button, PC Configure displays a screen that lets you select and download this data file.

Read/Write IP Address - (5300) This function displays the IP Address screen which reads/edits the IP address stored in the radio.

Figure 3.10 IP Address Screen

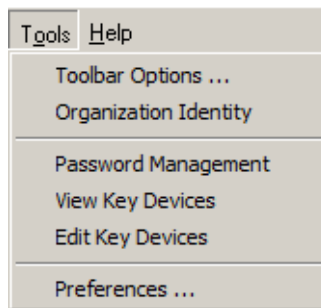


Note Appendix A describes how to copy an RCF file from an older radio using Flash Code 4.4.x or earlier to a newer radio using Flash Code 4.6.x or later.

3.4 Tools Menu

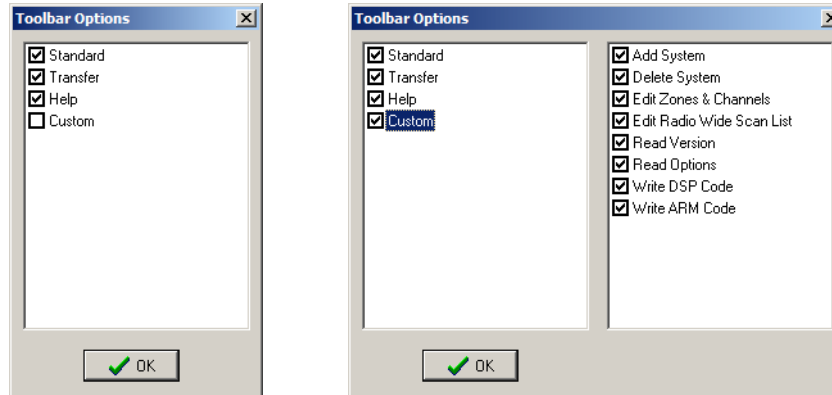
Figure 3.11 shows the **Tools** menu.

Figure 3.11 Tools Menu



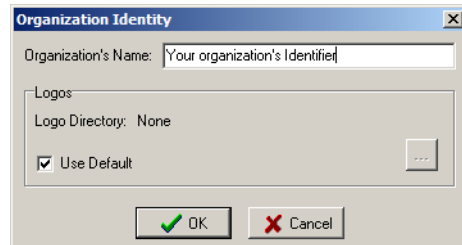
Toolbar Options - Displays the following dialog box from which you select the icons that the toolbar displays. When you check and highlight the **Custom** box, the additional window is displayed to allow you to select which icons to display. PC Configure saves the last selected configuration, then automatically reselects that configuration when you restart the program.

Figure 3.12 Toolbar options Screen



Organization Identity - Displays the following screen in which you can designate a unique company title and logo to display on the programmer screen.

Figure 3.13 Organization Identity Screen



To display a unique company name, enter the desired name in the **Organization's Name** box in this screen. It then displays after **Radio Configuration** - at the top of the screen. Refer to Figure 1.5.

A logo displays on the right end of the toolbar. When the radio performs a read or write operation, this logo changes. To display the default logo, check the **Use Default** box. To display a custom logo, create a bitmap file of the desired graphic that meets the following requirements. You can use a photo editing program to create the bitmap.

- 53 W x 22 H pixels
- .bmp file format
- 256 colors or higher recommended
- You can create a maximum of 30 files. You can name them *Logo1.bmp*, *Logo2. bmp*, and so on up to *Logo30.bmp*. These graphics are then displayed in rapid succession during a radio read or write operation.

Password Management - Displays the following screen in which you can enable, disable, and change radio passwords. You must connect a radio to the computer to display this screen. Actual passwords never display in this screen. PC Configure always represents passwords as eight asterisks (*****), regardless how long the passwords really are.

Figure 3.14 Radio Password Management Screen



User - This drop-down list selects the particular password that you want to change as follows:

User 1, User 2, User 3, User 4 - You can program up to four different power-on passwords. The same user features are available with each.

Upload, Download - The radio user must enter these passwords to Upload (read) or Download (write) programming parameters. The radio user does not need a **User** password to upload or download parameters.

Master - This password overrides all the other passwords. A system administrator can use it if any of the preceding passwords are lost.

Selected User - This box indicates status of the selected password (Enabled or Disabled). The **Password** box always indicates eight asterisks, and you cannot edit it.

Proceed as follows to set up or change a password. Passwords must be 1-8 characters long and consist of numbers 0-9. Zeros are valid characters in any location, even as leading characters.

To change a Password:

Note *To enter a password, click the first asterisk or select all eight asterisks. If you enter an incorrect password, a red “!” exclamation point displays to the right of the box. You must then reenter the password.*

- 1 Select the password in the drop-down menu.
- 2 If the password was previously set up, enter the current password in the **Original/Master Password** box. If this is the first time the password is used, it initially consists of null (deleted) characters. In this case, do not enter anything in this box.

- 3 If you are enabling or disabling the password, click the appropriate **Enable** or **Disable** button. Proceed to Step 6.
- 4 If you are changing or initially setting-up the password, enter the new password in the **New Password** box, then reenter it in the **Re-enter New Password** box to confirm it. Click the **Change** button.
- 5 Repeat for other passwords as required.
- 6 To exit without sending the change to the radio, click the **Cancel** button. To exit and send the change to the radio, click the **OK** button.

View Key Device - This field is used to view the Enhanced System Key (USB) file. (For 5100 and 5300 radios only.) Refer to Figure 3.15.

Figure 3.15 System Key Devices

The screenshot displays the 'Key Devices' software window, which is divided into two main sections: 'Master Key Device' and 'Slave Key Device'.

Master Key Device Section:

- Serial #:** 1
- System IDs:** A list box containing the numbers 2, 3, 4, and 5.
- Type:** P25 Trunking
- WACN ID:** 20
- Buttons:** >, >>, <, <<, and a 'Read' button at the bottom right.

Slave Key Device Section:

- Serial #:** 0
- Exp. Date:** 6/30/2006 (with a dropdown arrow and a 'None' checkbox)
- Creator Serial #:** 0
- Created By:** N/A
- System IDs:** An empty list box.
- Type:** P25 Trunking
- WACN ID:** 20
- Unit ID Ranges [0 .. FFFFFFF]:** A table with 3 rows:

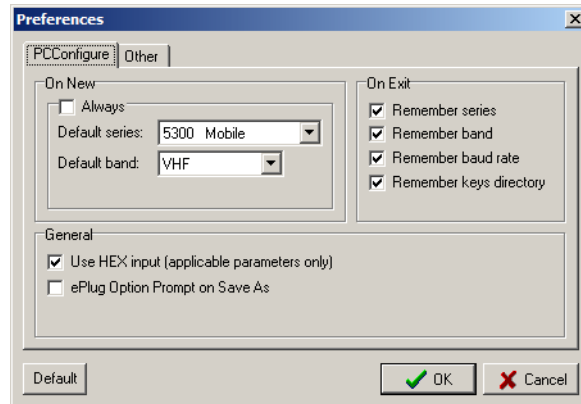
	Lower	Upper
1	12	15
2	0	0
3	0	0
- Group ID Ranges [0 .. FFFF]:** A table with 5 rows:


	Lower	Upper
1	1	5
2	0	0
3	0	0
4	0	0
5	0	0
- Buttons:** 'Read As Master', 'Write', 'Read', and a 'Close' button at the bottom right.

Edit Key Device - This field is used to define/edit the preferences that can be modified using the Enhanced System Key (dongle) file.


Preferences - Displays the following screens from which you can set several program preferences.


Figure 3.16 Preferences: PC Configure Screen



On New - When you check **Always**, PC Configure automatically creates a programming file with the radio series and band selected by the drop-down menus. This happens when **File → New** is selected or the  button clicked. However, you cannot change the band of the file, so you can only create files with the selected band. If you do not check this, select the band in a separate step before you create the file as described below.

On Exit - When you check one of the parameters in this box, PC Configure restores that parameter to the current condition when you restart the program. Otherwise, the default is selected. Note that if you check **On New → Always**, it overrides the first two parameters.

Remember series - When you create a new file by selecting **File → New** or clicking the  button, PC Configure automatically selects the current radio series. If you do not select this, “5300” is the default.

Remember band - When you create a new file by selecting **File → New** or clicking the  button, PC Configure highlights the current frequency band when the band select screen displays. You can also change the frequency band if you wish. If you do not select this, “VHF” is the default.

Remember baud rate - PC Configure automatically reselects the current baud rate. Refer to Section 3.3. If you do not select this, “19200” is the default.

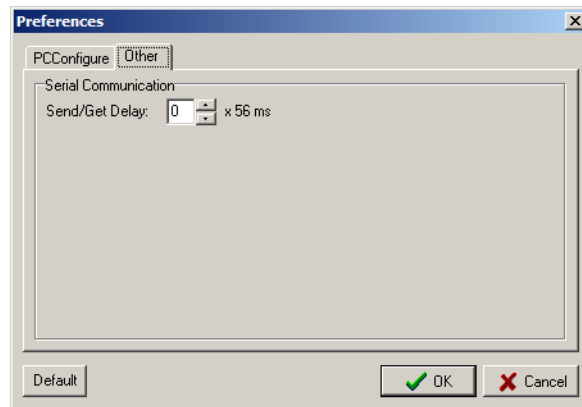
Remember keys directory - PC Configure automatically reselects the current key directory. If you do not select this, the “Keys” folder is the default. Refer to “Load System Keys” in Section 3.2.

Use Hex input (applicable parameters only) - When selected, you must enter all applicable numbers in hexadecimal format instead of decimal format. All hexadecimal numbers are indicated by an ivory-colored background. Refer to Section 1.9.4 for more information.

ePlug Option Prompt on Save As - Select this option to enable the ePlug functionality. If enabled, the ePlug ESN Input screen, Figure 13.5, is displayed.

The Preferences: Other screen, Figure 3.17, is shown below:

Figure 3.17 Preferences: Other Screen



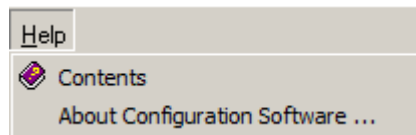
Serial Communication

Send/Get Delay - Allows you to program a serial port delay of 0-18 (x 56 ms). You may need to program this delay if you use computers that are slow to respond to serial port signals. If the software times-out during read/write operations, try increasing this delay. Usually, select the default level of “0” (no delay).

3.5 Help Menu

Section 3.18 shows the **Help** menu.

Figure 3.18 Help Menu



Contents - Displays the help system table of contents.

About Configuration Software - Displays the PC Configure version number and company information.

3.6 Toolbar

The tools in the toolbar provide quick access to many menu functions. To display the tools, select the **Tools → Toolbar Options** menu described in Section 3.4. You can use this menu to turn on and turn off the **Standard**, **Transfer**, **Help**, and **Custom** tools.

3.6.1 Standard Tools

Refer to Figure 3.1 for more information on these functions.



New - Opens a new programming file containing default parameters.



Open - Loads a file from disk. Clicking the down arrow displays a drop-down list of recently loaded files.



Save - Saves the current file to disk.

3.6.2 Transfer Tools

Refer to Section 3.3 for more information on these functions.



COM Port - Selects the serial port used to connect the radio to the computer.



Read Parameters From Radio - Transfers data from the radio to a new programming file.



Write Parameters To Radio - Programs the radio with the data in the current programming file.



Stop Data Transfer - Cancels the data transfer in progress.

3.6.3 Custom Tools



Add System - Adds a new system. Clicking the down arrow displays a drop-down list of the system types that can be added.



Delete System - When the Per System screen displays, clicking this button deletes the selected system.



Edit Zones and Channels - Displays the **Edit Zones and Channels** screen.



Edit Radio Wide Scan List - Displays the **Radio Wide Scan List** edit screen.



Read Version From Radio - Reads version information from the radio for the software it contains and then displays that information.



Read Options From Radio - Reads option information from the radio and then displays it.



Write Application Code To Radio - Programs the radio with new Application software.

3.6.4 Help Tools



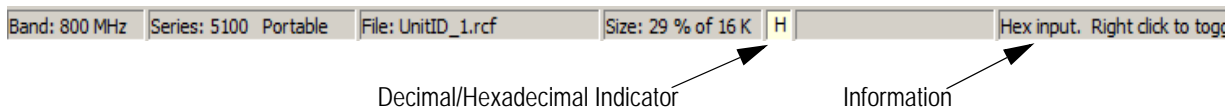
Help - Displays help information.

About Configuration Software - Provides contact information for EFJohnson.

3.7 Status Bar

Figure 3.19 shows the status bar.

Figure 3.19 Status Bar



Band - The frequency band of the file. You select this when you create a new file with the **File → New** function.

Series - The radio series of the file selected by the **Radio → Series** function.

File - The file name of the current programming file. You specify this name the first time you save the file with the **File → Save** function, or you can change it with the **File → Save As** function.

Size - Indicates the percent of the available memory that would use if you programmed the radio with the current file. Refer to Section 1.9.3.

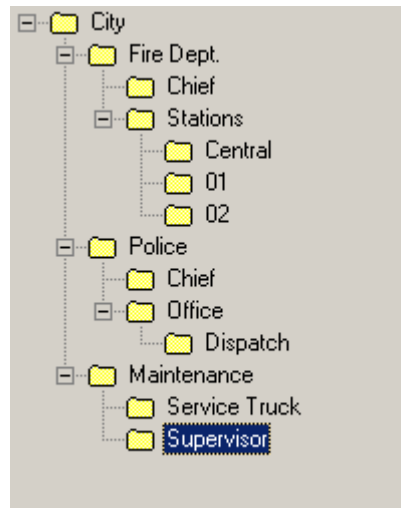
D/H Box - Indicates whether the decimal or hexadecimal number format is selected. Refer to Section 1.9.4.


Information - Displays a short description of tools in the toolbar when they are selected by the cursor.

3.8 Organizer






Figure 3.20 shows an example of the organizer screen.

Figure 3.20 Organizer Screen Example



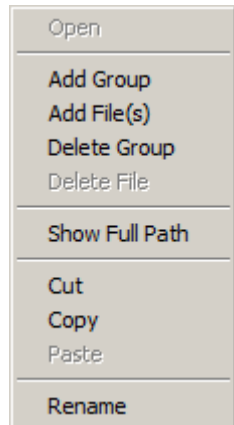
Clicking the organizer button  on the right end of the toolbar toggles the preceding screen that you can use to organize many programming files into groups and subgroups. This should make it easier for you to organize files if you administer a large organization.

Note *This organizer does not add, delete, or move programming files on the hard drive. It helps you organize those files into logical folders and subfolders.*

The folder symbol  represents groups. The  symbol represents programming files. A  symbol next to an item indicates that the branch is expanded, and clicking it collapses the branch. Likewise, a  symbol indicates that the branch is collapsed, and clicking it expands the branch. If a file in the organizer was deleted from the hard drive, it is indicated by a red “X” through the icon .

- 1 To add the current programming file to the Organizer, select the desired group in the organizer and then select the **File → Send to Selected Organizer Group** menu item. Refer to Section 3.1. To add other files, see Step 3.
- 2 To open a file listed in the organizer, simply double click it, drag it to the main programmer screen, or select **Open** as described in the next step.

- 3 To add, edit, delete, or move a group or file, right click the applicable group or file. The following window is displayed.



Open - Opens the selected file. If you have not saved the current file, PC Configure asks you if you would like to save it first.

Add Group - Adds a new group below the selected location.

Add File(s) - Displays a screen that you can use to select a file on the hard drive to add to the selected location.

Delete Group - Deletes the selected group from the organizer only. If you select **Delete Group**, it does not delete the actual files on the hard drive.

Delete File - Deletes the selected file from the organizer only. If you select **Delete File**, it does not delete the actual files on the hard drive.

Show Full Path - Displays the entire path name of the file on the hard drive.

Cut - Moves the selected group or file to the clipboard.

Copy - Copies the selected group or file to the clipboard.

Paste - Copies the current clipboard file to the selected location

Rename - Renames the selected group.

Note *You cannot rename files from the organizer.*

Global Screen

PC Configure global parameters are the same for all systems, channels, and zones. Two screens contain the interface at which you program these parameters. This section describes the parameters that you find on these screens.

4.1 Global Parameters: Initial Screen

Figure 4.1 shows the initial **Global** parameters programming screen. The screen displays as active only those parameters that apply to the selected radio series. The other parameters are grayed out.

Figure 4.1 Initial Global Parameter Programming Screen (for 5100 Series)

The parameters in this screen are as follows:

Systems

Number of Systems - Displays the number of systems that have been created as described in Section 1.10.

Zones - A zone is a programmed collection of a maximum of 16 channels of any type.

Number of Zones - The total number of zones currently set up. The maximum number allowed is 16. Zones are created in the **Zone → Edit Zones** screen by clicking the **+** button. Refer to *Setting Up Zones, SetUp Procedure* for the system programmed.

Home - Selects the zone set for the Home Zone option function button (if programmed).

Home 2 - Selects the secondary Home Zone function button.

Power Up in - Selects whether the radio powers up on the Home or Last Selected zone.

Power Up Zone - When data is uploaded from a radio, this number indicates the power-up zone in the radio. It does not change until the current data is downloaded and then uploaded again.


Favorites  **Favorites** - Provides users the ability to setup their “Favorite Channels” in one dynamic zone, allowing the user to change channels at will, without impacting any of the zones / channels that are already programmed. When the Favorites button is selected, the following screen is displayed.

Figure 4.2 Favorite Zone / Channels Screen

No	Zone	Channel
1	ZONE1	CHAN1
2	ZONE1	CHAN2
3	ZONE1	Unprogrammed
4	ZONE1	Unprogrammed
5	ZONE1	Unprogrammed
6	ZONE1	Unprogrammed
7	ZONE1	Unprogrammed
8	ZONE1	Unprogrammed
9	ZONE1	Unprogrammed
10	ZONE1	Unprogrammed
11	ZONE1	Unprogrammed
12	ZONE1	Unprogrammed
13	ZONE1	Unprogrammed
14	ZONE1	Unprogrammed
15	ZONE1	Unprogrammed
16	ZONE1	Unprogrammed

Once enabled, you can change the name of the Favorites Zone and the channel assignments. The default name is set to “FAVORITES”. You may set the 16 Favorite channels via drop-down menus that show all of the zones and channels programmed in the radio (Refer to Section 2.5). If no Zone/Channels are selected, the channel is unprogrammed.

Edit Combined Display Edit Combined Display - Combined Zone/Channel Display. You can combine channel and zone aliases on radio display. Enter up to nine characters to identify the channel and zone.

Figure 4.3 Combined Zone/Channel Display

Channels

Home - Selects the channel set for the Home Zone function button (if programmed) when the radio powers up on the Home zone. With the 51xx, the radio user can select this only if the channel selector switch is disabled. Refer to the “Channel Selector Enabled” parameter field on this screen.

Home 2 - Selects the channel set for a secondary Home Zone function button (if programmed) when the radio powers up on the Home zone.

Power Up in - Selects if the Home or Last Selected channel is selected on power up. With the “Last Zone”/“Home Channel” power-up configuration, you select the programmed home channel number of the last active zone. If that channel number is not programmed in the active zone, “Unprogrammd” displays. With the 51xx or Ascend portable, only “Home Channel” is available if the channel selector switch is enabled.

Power Up Channel - Indicates the power-up channel in the radio similar to Zones → Power Up Zone.

Global Emergency Channel - Selects the zone and channel on which you transmit all emergency calls and alarms, regardless of the channel type currently selected. For example, if the global emergency channel is a conventional channel and a trunked channel is selected when the emergency is initiated, it transmits on the conventional global emergency channel.

Zone - The zone on which all emergency calls and alarms are transmitted.

Channel - The channel on which all emergency calls and alarms are transmitted.

Power

Battery Saver (portables only) - If this is checked, 51xx and Ascend automatically switch to the low transmit power mode when the RSSI signal indicates the site is probably nearby. This occurs only when the radio operates in the SMARTNET/SmartZone or Project 25 trunked modes.

Low Battery Indicators (portables only)

Low Battery Beep - When checked, a short tone sounds periodically in the standby mode while the radio detects a low battery condition.

Tx Chirp - When checked, a chirp sounds each time the radio user presses the PTT switch while the radio detects a low battery condition.

LED Indicator - When checked, the LED on the top panel indicates a low battery condition. For example, the 51xx indicator flashes red in the receive mode.

Low Tx Power - When checked, the radio operates on low transmit power when it detects a low battery condition.

Ignition Power Down (mobiles only) - When the ignition switch controls radio power, this sets the delay that occurs between when the radio user turns the ignition switch off and when the radio power actually turns off. You can select times of 0-254 minutes or an infinite time (no turn-off).

Ignition Power Down: 0 (m) ☐ Inf.

Sound

Tone ON - If you check this, all supervisory tones sound. If you do not check this, no tones sound.

Horn Cadence (53xx and Ascend mobiles only) - Programs the following styles when the horn alert option switch enables the horn alert. This feature is enabled for Unit Calls and Interconnect Calls only and requires the Horn Honk button/menu option. Repeating does not occur with either style.

Style 1 - The horn is on for one second and off for 0.5 second for three cycles.

Style 2 - The horn sounds continuously for the programmed time (2-255 seconds).

Minimum Volume (mobiles, 51xx, and Ascend portable) - Sets the minimum volume level the volume control can select. You can use this to prevent missed messages caused by unintentionally turning the volume down too far. Relative levels of 0-255 can be set in steps of 1 ("0" sets the lowest minimum volume).

Alert Tone Volume - This adjusts the alert tone volume level relative to the volume control setting. The radio user can also do this by a Tone Volume Edit option button if one is programmed. Changes made by this button permanently override this setting. You can set relative levels of -170 to +170 in steps of 1. "0" is the standard default setting.

Keypress Tone Volume - Adjusts keypad button press tone levels.


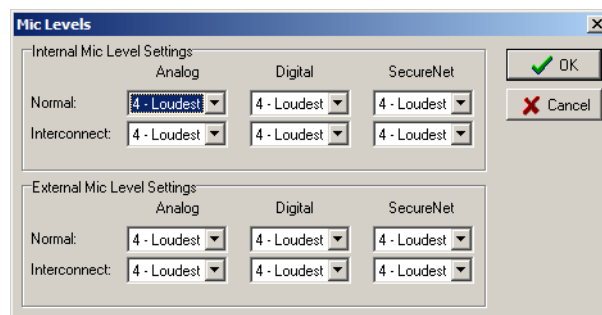
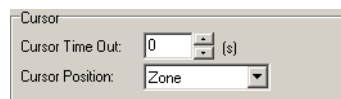
Mic Levels  - Displays the following screen which sets the microphone sensitivity for various types of calls. You can set relative levels of 0 (least sensitive) to 4 (most sensitive) for analog and digital calls, with "4" the default.

Figure 4.4 MIC Levels Screen



Cursor (53xx and Ascend Mobile only)



Cursor Time Out - Programs the time delay that occurs before the cursor (zone or channel select indicator) returns to the default position programmed in the next parameter. You can program times of 0-255 seconds. "0" selects no return.

Cursor Position - Selects whether the Zone or Channel select mode is enabled when the radio user turns the power on and after the preceding time-out period expires.

Keypad (Portables Only)

Keypad Type - Selects if the portable radio has a full DTMF Keypad, a limited keypad (without the 0-9, *, # DTMF keys), or Model I (with no keypad nor display).

Permanent Keypad Lockout - If this is checked, you disable the front and side panel keys. The user cannot enable them again. If you select the Front Only Keypad Lockout parameter that follows, only the front panel keys are disabled. The radio user can still use the side panel keys.

Lock Channel Selector - When checked, the Keypad Lockout function also temporarily locks the top panel channel selector switch. When not checked, it remains functional when the keypad is locked. To totally disable this control, do not select Channel Selector Enabled which follows.

Lock Volume Knob - When checked, the top panel volume control function (but not on-off) is also temporarily locked by the Keypad Lockout function. When not selected, it remains functional when the keypad is locked. To totally disable this control, program an Up/Down volume button. Refer to the following section on the Volume Ticks parameter.

Front Only Keypad Lockout - This controls the keys that are disabled by the preceding Permanent Keypad Lockout function and the Keypad Lockout option button if programmed. If neither of these functions is used, checking this parameter has no effect. If this box is checked, the front panel keys are disabled but the side panel keys remain active. If this box is not checked, both the front and side panel keys are disabled.

Backlight During Keypad Lockout - If you check this box, the backlight turns on normally when the user presses a key with the keypad locked (if Backlight on Keypress which follows is enabled). If you do not check this box, the backlight is also disabled when the keypad is disabled.

Other

The image shows two side-by-side screenshots of a configuration menu titled 'Other'. The left screenshot is for the '5100 Series (Portables)' and the right is for the '5300 Series (Mobiles)'. Both screens display the same set of options:

- ☐ Hangup Box Monitor
- ☒ Backlight on Keypress
- ☐ Programmed Channels Only on Display
- Backlight ON Time: 2
- Backlight Level: Off
- Controller Type: Normal
- Volume Ticks: 10
- ☒ Menu Enabled
- ☒ Channel Selector Enabled
- ☐ Ignore Clear/Secure Switch when Strapped
- ☐ LED Disabled w/ Backlight OFF
- ☐ Channel 1 Audio Alert

Hangup Box Monitor (mobiles only) - When checked, enables microphone off-hook detection. Taking the microphone off-hook then enables the monitor mode (conventional only) and disables scanning. The monitor mode unsquelches the receiver and monitors the channel even if a carrier is not detected.

Note *If microphone off-hook detection is enabled, monitor mode does not operate as described in the operation manual for monitor mode push button function.*

When Hangup Box Monitor is not checked, taking the microphone off-hook has no effect on these functions.

Backlight on Key Press (portables only) - If checked, the backlight turns on for the Backlight ON Time whenever the radio user presses a key.

Programmed Channels Only on Display (53xx only) - If you check this box, the radio user can select only programmed channels. If you do not check this box, the radio displays all channels. When the radio user selects an unprogrammed channel, “UNPROGRAMD” displays and a tone sounds.

Backlight ON Time (portables only) - Programs the period of time in seconds the backlight stays on after it is enabled by pressing a key. Refer to the preceding section on Backlight on Key Press. You can program times of 0-7.5 seconds in 0.5-second steps. When the radio user turns on the backlight by the option switch or menu parameter, the backlight stays on.

Backlight Level (mobiles only) - Selects the backlight brightness as “Off,” “Mid,” or “High” whenever power is on. The backlight option switch can override this setting if that switch is programmed.

Controller Type (53xx only) - Selects the type of control head being used. Select “Normal” for the standard front or remote mount control head. Select “Handheld” for the Handheld Control Unit.

Volume Ticks (51xx only) - When you program a Volume Up/Down button on the Radio Wide screen for a particular system type, the volume control is disabled when the radio user selects a channel programmed for that system type. This then selects the number of button presses (“ticks”) required to change from minimum to maximum volume. You can program from 1 to 50 steps. Refer to the preceding section on the Lock Volume Knob parameter.

Menu Enabled

(51xx only) - Enables the menu mode with 51xx portables. The <F1> and <F2> keys then become menu exit and select keys instead of programmable option keys. If you do not select this parameter, the menu mode is not available and <F1> and <F2> remain as programmable option keys.

(53xx only) - Enables the menu mode with 53xx mobiles. Use the press and hold activation of the Zone/Channel button on the control head to enter Menu mode. When the “Enable Menu Mode” check box on the Radio Wide page is checked, the user can program the contents of the Menu just as one does on the 5100 Menu page. The PowerPC code implements a timer to detect a press and hold situation on the Zone / Channel button, just like a “Menu” button press on the portable in all contexts.

Once you enter the Menu mode:

- programmed buttons are deactivated just like in the 5100.
- the <F6> button (far right looking at the control head) become the Navigate Up button (5100 <F1> equivalent).
- the Zone/Channel button press function become the Navigate down function (5100 <F2> equivalent).
- the Zone/Channel rotation events become the Menu up/down function (5100 rocker switch equivalent).

Channel Selector Enabled (51xx only) - Enables the channel select knob in the top panel. If you do not check this, you permanently disable the channel select knob and the

radio user can only select channels by the Channel Select option button or menu parameter. Refer to the preceding section on the Lock Channel Selector parameter.

Ignore Clear/Secure Switch when Strapped - When you select this, the mode selected by the switch (or menu parameter with the 51xx) is ignored and the transmission always occurs in the strapped mode. In addition, the error tone and “Sec Only” or “Clear Only” do not display when the switch selects a different mode than the one that is strapped.

Note *If all channels and talk groups are strapped Clear or Secure and no Clear or Secure option switch or menu parameter is used, you must always select this parameter. Refer to the following.*

Without the Clear/Secure switch or menu parameter, the radio is always in the last known state (usually Clear) and there is no way to change it. For example, if the last known state is Clear and you do not select this parameter, the radio user can never transmit a Secure message on a channel strapped Secure. When the user tries to do this, the following occurs:

- Transmitting is disabled
- An error tone sounds
- “Sec Only” displays

LED Disabled w/ Backlight OFF (5300 Only) - When you select this, the front panel transmit indicator is disabled whenever the display backlight is off. If you do not select it, this indicator operates normally regardless of the backlight state (except when you select the surveillance mode).

Channel 1 Audio Alert (5300 Only) - When rolling from channel 16 to channel one, an audio tone sounds to alert the user that you have rolled over to the beginning of the zone.

4.2 Global Parameters Additional Parameters

You open and close a second **Global** screen when you click the **<< >>** buttons in the upper right corner of the screen. Figure 4.5 and Figure 4.6 show this second screen.

Figure 4.5 Global Additional Parameters Programming Screen (for 5100 series)

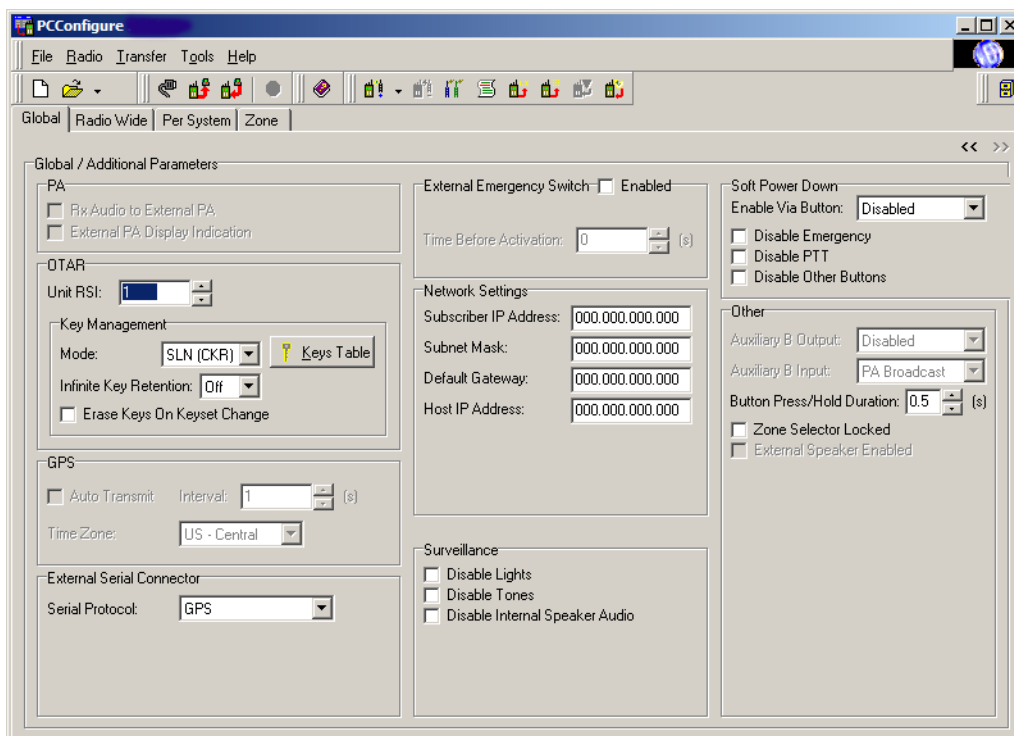
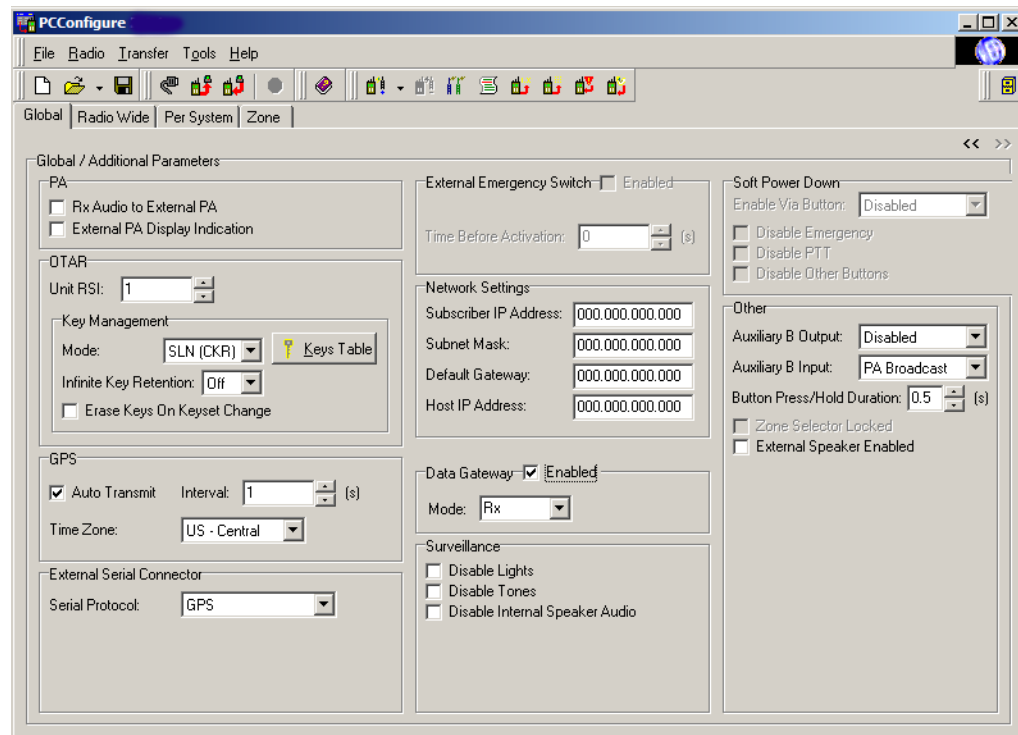


Figure 4.6 Global Additional Parameters Programming Screen (for 5300 series)



The second **Global** screen displays the following parameters:

PA (5300 only)

Rx Audio to External PA - Microphone audio always connects to the Ext PA line of the accessory cable. If you select this parameter, the receive audio signal also connects to this line.

External PA Display Indication - If you select this, “Ext PA On” displays continuously when the Ext PA option button enables the external PA function. If you do not select it, “Ext PA On/Off” flashes in the display when the radio user presses a button.

OTAR (Over-the-Air Rekeying)

Unit RSI - This sets the individual Radio Set Identifier of the OTAR radio. You typically set this number to the Digital Unit ID, but you can also program other numbers if you wish to do so. The allowed range is 1 - 9,999,999.

Key Management - Your key management mode determines the method you use to load and manage encryption keys. The Motorola keyloader has ASN and Astro 25 modes. You can use the ASN mode to load analog channel keys (DES) only. You can use the Astro 25 mode to load both analog and digital (DES-OFB or AES) channel keys.

Mode - Select the PID/ASN or SLN/CKR mode as follows. The keyloader function of the EFJohnson Subscriber Management Assistant (SMA) supports the SLN mode only. The Motorola keyloader operates only in the ASN mode when you select “PID/ASN”, and in either the ASN or Astro 25 mode when the you select “SLN/CKR”.

PID/ASN Mode - Select this mode to load analog channel keys directly into a Key PID (Physical ID) from 0-15. The following restrictions are true of this mode:

- You can load digital channel keys in this mode
- OTAR is not available
- You cannot use the keys table

SLN/CKR Mode - Select this mode to load keys into an SLN/CKR location from 1-4095 instead of a Key PID location from 1-16.

Note *You must select this mode to program the radio for OTAR.*

You can specify a maximum of 16 SLNs. The following key (alias) table links each SLN to a Key PID. Storage Location Number (SLN) and Common Key Reference (CKR) are equivalent terms.


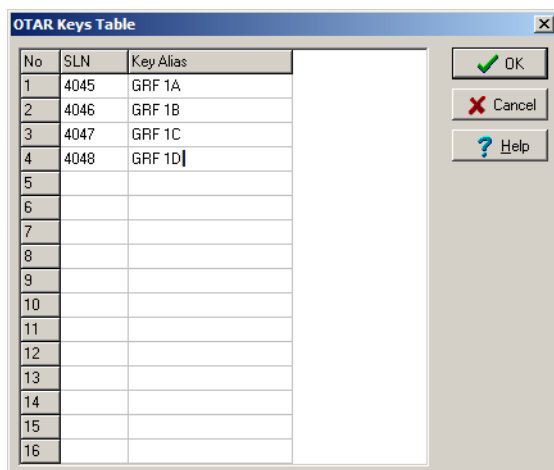
Keys Table  **Keys Table** - Clicking this button displays the OTAR keys table screen shown in Figure 4.7. In this screen, associate Key PIDs 1-16 with the SLN/CKRs from 1-4095 specified when you load the key. You must program this table if you selected the SLN/CKR mode described above. The SLN/CKR number points to a specific key slot (of both keysets is using OTAR). The radio briefly displays the ten-character key alias when transmitting, changing channels, and switching between the clear and secure modes.

Figure 4.7 OTAR Keys Table Screen



No	SLN	Key Alias
1	4045	GRF 1A
2	4046	GRF 1B
3	4047	GRF 1C
4	4048	GRF 1D
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

Infinite Key Retention - If you select “On”, the radio stores keys in its memory and does not lose them when power is removed. If you select “Off”, the radio maintains the keys with power removed only until the storage capacitance discharges (approximately eight hours with a 53xx mobile and 30 seconds with a 51xx portable).

Erase Keys on Keyset Change (OTAR only) - If this is selected, the keys in the original keyset are erased when the OTAR Changeover command or the Keyset option switch are used to select the other keyset. If this not selected, the keys in the original keyset are not erased when this occurs.

GPS (5300 Only) -The GPS feature can be used with other equipment to determine the geographical location of the subscriber unit.

Auto Transmit - Check if you wish the location of the unit to be transmitted.

Interval - If Auto Transmit selected, enter the time intervals for transmittal in one-second intervals.

Time Zone - Select your time zone or Greenwich time.

External Serial Connector

Serial Protocol - Select GPS if using external device and Other if using P25 data over IP applications. SMU/UDDI is supported only on Multi-Net systems and provides the serial protocol supporting legacy Multi-Net UDDI data interfaces. Aux Output B is dedicated to handshake/CTS when SMU/UDDI is selected.

External Emergency Switch (51xx/Ascend Portable Only) - Selects the emergency mode if the radio remains in a horizontal position for the programmed time. The emergency mode selected by this feature functions the same as if the radio user pressed the emergency button. To use this feature, you must select it from the screen. You must also attach a man-down device to the accessory port of the radio. You can program the timer for 0-63 seconds. The feature resets if the radio user moves the radio back to a vertical position. The radio user can cancel the emergency mode by pressing the emergency button.

Enable - Check this box to enable this feature.

Time Before Activation - 0 to 63 seconds. Time the radio can remain in a horizontal position before emergency signal is sent.

Network Settings - The radio IP address may be set one of two ways: Using the **Transfer → Read/Write IP Address** or setting the network settings on this screen. This is used for 5300 gateway for OTAR to other manufacturing infrastructure and it also makes use of the P25 data over IP, which you can send text or files via OTAR using the P25 data over the air protocol using the application P25dataOverIP. Set static IP addresses for the following:

Subscriber IP Address

Subnet Mask

Default Gateway

Host IP Address

Data Gateway (5300 only) - Enables two 5300 radios to be networked for OTAR operations.

Enable - Check this box to enable this feature.

Mode - Set accordingly if radio can transmit or Receive OTAR operations.

Surveillance - Disables the transmit/receive LED indicator, display and keypad backlight, and all alert tones. This provides a quick way to disable these functions in all operating modes. It overrides any other programming of these functions such as a Tone or Backlight option switch. A transmit icon in the display indicates the transmit mode when the LED indicator is disabled by this mode (51xx). This icon displays only in the Surveillance mode.

Disable Lights - Check this box to disable the lights.

Disable Tones - Check this box to disable the tones.

Disable Internal Speaker Audio - Check this box to disable the audio.

Soft Power Down (51xx and Ascend portable only) - The soft power down feature prevents the radio user from turning off the radio power accidentally turning the top panel on-off/volume control. You can program any side option button for this function (in addition to the button's normal function). Then, to turn the power off, the radio user must press the programmed option button during or just after power is turned off by the on-off/volume control.

Enable via Button - Turns on the soft power down feature and designates which button the feature is assigned too. This would require that the selected button be pressed to power off the radio once the on/off switch has been moved to the off position. Prevents accidental radio power down. Options are: "Disabled" or select the side button to enable: "Side Button 1", "Side Button 2" and "Side Button 3".

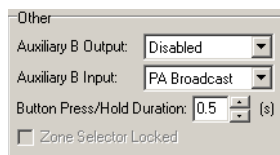
The following three fields require the use of the soft power down feature and puts the radio to stand by if the on/off switch is turned to the off position.

Disable Emergency - Disables this function when the radio is in stand by mode. If Emergency and PTT are not selected here, pressing either of those buttons will cause the radio to come out of stand by mode and either send the emergency or transmit the radio.

Disable PTT - Disables this function when the radio is in stand by mode. If Emergency and PTT are not selected here, pressing either of those buttons will cause the radio to come out of stand by mode and either send the emergency or transmit the radio.

Disable Other Buttons - Disables this function when the radio is in stand by mode. If the "Disable Other Buttons" is selected, the only way to bring the radio out of stand by mode is to turn the on/off switch back on. The radio won't fully power down until the soft power down button is pressed.

Other



The screenshot shows a software window titled "Other" with the following settings:

- Auxiliary B Output: Disabled (selected in a dropdown menu)
- Auxiliary B Input: PA Broadcast (selected in a dropdown menu)
- Button Press/Hold Duration: 0.5 (with up/down arrows) (s)
- ☐ Zone Selector Locked

Auxiliary B Output (53xx/Ascend Mobile Only) - Determines the function controlled by Pin 4 output of the accessory connector:

“Backlight” - When you program the Siren option, the control head backlight also controls the Siren Controller backlight.

“Horn” - Controls an external horn alert.

“Site Trunking” - Controls an external site trunking indication of some type with SmartZone and Project 25 trunked operation.

“Disabled” - The output is nonfunctional.

Note *Auxiliary B Output is dedicated to handshake/CTS when SMU/UDDI is selected in the External Serial Connector field.*

Auxiliary B Input (53xx/Ascend Mobile Only) - Determines the function controlled by Pin 8 input of the accessory connector:

“PA Broadcast” - Selected with the Transit Bus PA option only to allow the radio user to select the public address function using an external switch.

“Ext Emergency” - Selected if the radio user can use an external emergency switch, such as a foot-activated type, to activate an emergency condition.

“Disabled” - The input is nonfunctional.

“Monitor” - Selected if the radio user can use an external monitor switch, such as a foot-activated type, to activate the monitor mode.

Button Press/Hold Duration - Programs how long you need to press the button to enable it. This is so the user does not accidentally push a button, but has to press it for the duration programmed to activation for use.

Zone Selector Locked (5100 only) - When the radio is turned on, the zone that comes up is the only one that can be used. Checking this box disables the user from changing zones and the radio stays in the Home Zone selected on the Primary Global page.

External Speaker Enabled (5300 only) - This function is not supported.

Conventional Systems

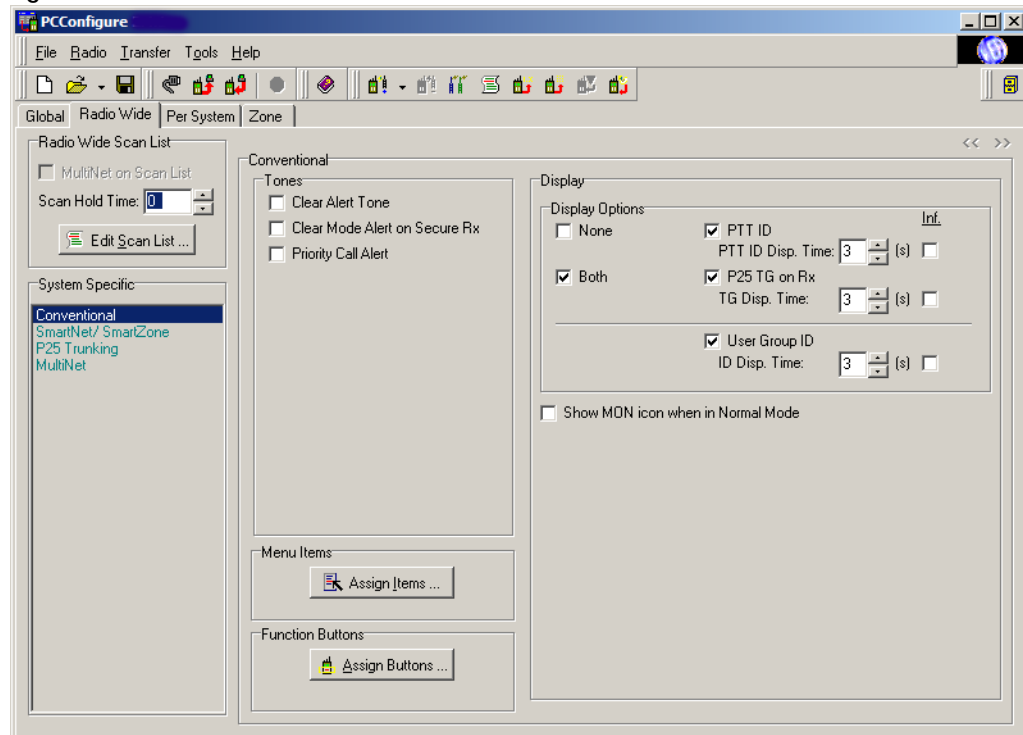
5.1 Radio Wide Screen

The **Radio Wide** screen programs parameters for all Conventional, Project 25 Trunked, SMARTNET/SmartZone, and Multi-Net systems. Areas of the screen common to all protocols are shown in Figure 2.1. A different screen displays for each system type. Figure 5.1 shows the Conventional screen. This section contains the instructions to program these parameters for Conventional systems.

5.1.1 Radio Wide Conventional Parameters

Select “Conventional” in the **System Specific** box to display the screen shown in Figure 5.1. This screen programs the functions for Conventional systems.

Figure 5.1 Radio Wide Conventional Screen



Tones

Clear Alert Tone - If checked, a short beep sounds to indicate that the radio user selected the clear (non-encrypted) mode. This tone sounds with digital OFB encryption only.

Clear Mode Alert on Secure Rx - When you select this, a beep sounds whenever the radio receives a Secure (encrypted) call in the Clear mode on a conventional channel. If you do not select this, no beep sounds when this occurs.

Priority Call Alert - An audible tone tells the user he is receiving priority traffic and not just a standard scan channel. Although this feature is active for all systems, it is particularly applicable for the 5100 ES Model I radios.

Display Options - Select whether anything displays alternately with the selected channel alias or frequency when the radio receives Project 25 group calls.


None - Only the selected channel alias or frequency is displayed.

Both - Both of the following are displayed:

PTT ID - The ID of the mobile placing the call displays. You can program this ID to display for 0.5-7.0 seconds or “infinite”. When you select “infinite”, this ID displays for the entire call and none of the other parameters display.

P25 TG on Rx - The radio displays the alias of the talk group of the received call. You can program this to display for 0.5-7.0 seconds or “infinite” as just described.

User Group ID - If the ID of the received call is included in a User Group ID list as described in Section 5.2.2.7, the alias of that group displays. You can program this to display for 0.5-7.0 seconds or “infinite” as just described.

Show MON Icon When in Normal Mode - If checked, the monitor indication in the display ( with 5100, MON with 5300) turns on when you select the “Normal” mode by the Normal/Selective option button or menu parameter (5100 only). If you do not check this, there is no continuous indication when the radio user selects this mode.

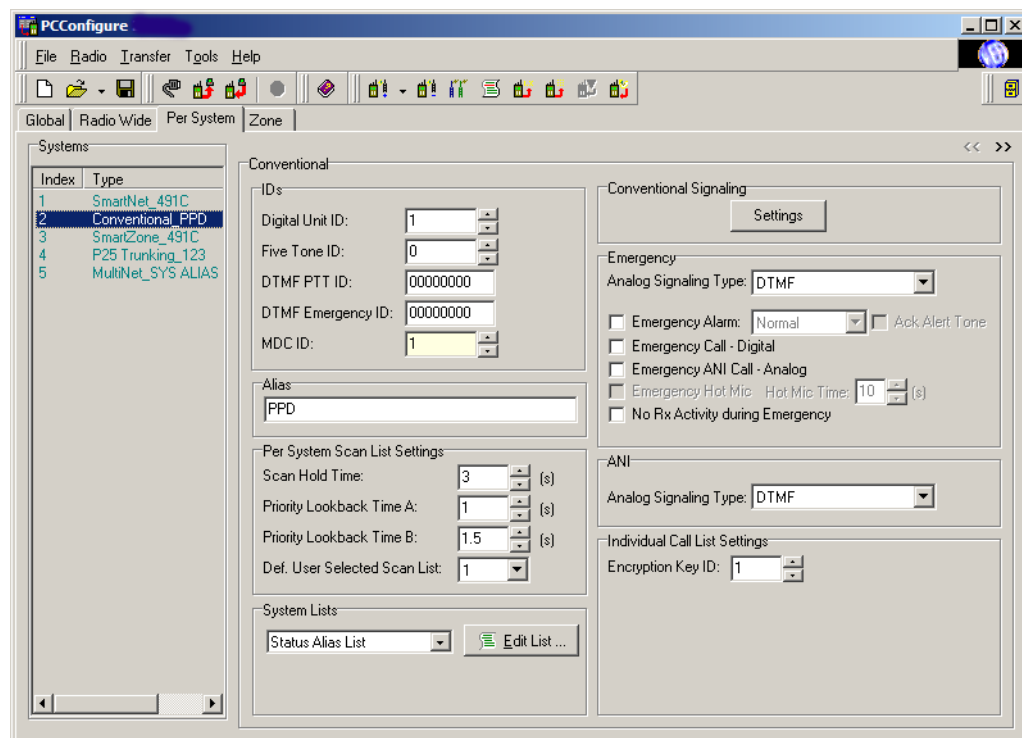
5.2 Per System Screens

This section contains descriptions of the parameters found on the **Per System** screens. Figures 5.2 and 5.4 show the **Per System** tab discussed in this section.

5.2.1 Individual Conventional System Parameters

You can program Individual system parameters using the **Per System** screen shown in Figure 5.2. These parameters can be programmed after the desired systems have been set up as described in Section 1.10.

Figure 5.2 Conventional System Screen



System - Select the system for which you wish to set parameters. Radio-wide parameters are programmed by the **Radio Wide** screen as described in Section 2.4.1. For information on programming individual SMARTNET/SmartZone and Project 25 Trunked system parameters, refer to Sections 6.2.1 and 7.2.1. The parameters in the individual Conventional System screen are as follows:

IDs

Digital Unit ID - This number identifies the radio when it operates on a Project 25 (digital) channel. Each radio must have a different ID, and it must be between 1 and 16,777,216.

Five Tone ID - Program for a RTT signaling or a pre and post ANI. Consisting of four digits from 0-9. Radio does not decode the five tone ID, only consoles will be able to decode the RTT or ANI signaling.

DTMF PTT ID - Channels programmed for pre- or post-transmit ANI use the PTT ID if the system is programmed for the DTMF analog signaling type. This ID consists of eight digits from 0-9. Program the ANI function on the channel screen as described in Section 5.3.3.

DTMF Emergency ID - This sets the ANI number that transmits if you selected the “Emergency ANI Call” or “Emergency Alarm” analog emergency features on the conventional **Per System** screen.

MDC ID - 5100 portable and 5300 mobile models support the ANI and Emergency Alert features of the Motorola MDC1200 data protocol. This ID, with values from 0 to 65535, transmits if you select the MDC Analog Signal Type on the Conventional Per System screen, and if you program ANI or Emergency Alert. You program Emergency Alert and ANI parameters on the **Per System** screen, and you enable ANI on the channel screen.

Alias - Programs the alias that is displayed for the system in the left pane after the system type. This alias is used as an identification aid when programming Zones and Channels and is not displayed by the radio.

Per System Scan List Settings - These parameters set various timers that control priority scanning when a channel assigned to the system is selected.

Scan Hold Time - Sets the delay that occurs before scanning resumes after a signal is no longer received. Times of 0 -7.5 seconds can be programmed.

Priority Lookback Time A - This time determines how often the priority channel is checked for activity. Times of 0.25-4.00 seconds in 0.25-second steps can be programmed.

Priority Lookback Time B - This time determines how often the priority channel is checked once an incorrect Call Guard (CTCSS/DCS) or NAC code is detected. Since it takes much longer to detect an incorrect Call Guard signal than a carrier, this time should be relatively long to prevent the interruptions from making a message difficult to understand. Times of 0.5-8.0 seconds can be programmed in 0.5-second steps.

Default User Selected Scan List - Selects the scan list that is normally always selected on power up. A different scan list can be temporarily selected using the Scan List option switch or menu parameter (if applicable). This setting is overridden if a scan list is slaved to a particular zone on the **Zone** setup screen (see Section 5.3).

System Lists - Refer to Section 5.2.2 for information on these lists.


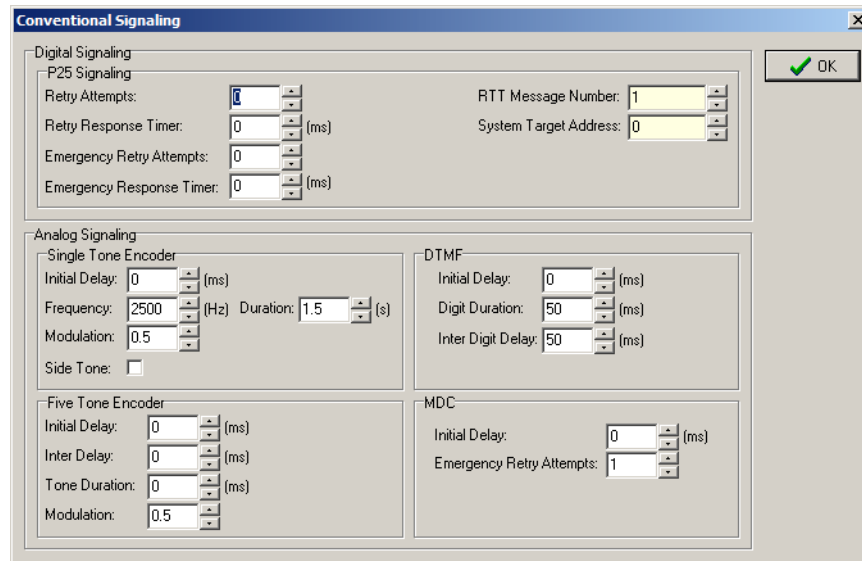
Conventional Signaling - Select the Settings Button  to display the Conventional Signaling screen, Figure 5.3. This screen provides parameters and settings for Conventional digital (P25) and analog signaling.

Figure 5.3 Conventional Signaling Screen



The screenshot shows the 'Conventional Signaling' window with the following settings:

Section	Parameter	Value	Unit
Digital Signaling	P25 Signaling		
	Retry Attempts	1	
	Retry Response Timer	0	(ms)
	Emergency Retry Attempts	0	
	Emergency Response Timer	0	(ms)
Analog Signaling	Single Tone Encoder		
	Initial Delay	0	(ms)
	Frequency	2500	(Hz)
	Duration	1.5	(s)
	Modulation	0.5	
	Side Tone	<input type="checkbox"/>	
	DTMF		
	Initial Delay	0	(ms)
	Digit Duration	50	(ms)
	Inter Digit Delay	50	(ms)
Five Tone Encoder	Initial Delay	0	(ms)
	Inter Delay	0	(ms)
	Tone Duration	0	(ms)
	Modulation	0.5	
	MDC		
Initial Delay	0	(ms)	
Emergency Retry Attempts	1		

An 'OK' button with a green checkmark is located in the top right corner.

Digital Signaling

RTT Message Number - This message identifier is selected by the user to represent an RTT which is definable in the portable and mobile radio as well as the dispatch console system.

System Target Address - This address indicates that the message is not sent to a particular unit, but to the system infrastructure.

The other information provided on the Conventional Signaling screen includes:

P25 Signaling

Retry Attempts - In the event that an RTT is not received by the system, the radio shall retransmit the RTT message until a successful ACK_RSP_FNE message is received or the maximum number of retransmissions is reached.

Retry Response Timer - If the radio does not receive the ACK_RSP_FNE message, this is the delay between the retry attempts.

Emergency Retry Attempts - In the event that an emergency alarm is not received by the system, the radio shall retransmit the emergency alarm message until a successful ACK_RSP_FNE message is received or the maximum number of retransmissions is reached.

Emergency Response Timer - If the radio does not receive the emergency alarm message, this is the delay between the retry attempts.

Analog Signaling

Single Tone Encoder

Initial Delay - This the delay before the actual signal is sent.

Frequency - The frequency of the tone being sent.

Duration - The amount of time the frequency is transmitted.

Modulation - An adjustable modulation value. Minimum is 0.5 and maximum is 0.8.

Side Tone - Enables a side tone when transmitting a single tone encoder.

Five Tone Encoder

Initial Delay - The delay before the actual signal is sent.

Inter Delay - The delay between each of the five tones being sent.

Tone Duration - The transmitted time duration of each tone.

Modulation - An adjustable modulation value. Minimum is 0.5 and maximum is 0.8.

DTMF

Initial Delay - The delay before the actual signal is sent.

Digit Duration - The duration of each of the tones being sent.

Inter Digit Delay - The delay between each of the tones being sent.

MDC

Initial Delay - The delay before the actual signal is sent.

Emergency Retry Attempts - In the event that an emergency alarm is not received by the system, the radio shall retransmit the emergency alarm message until a successful ACK_RSP_FNE message is received or the maximum number of retransmissions is reached.

The remainder of the fields from the **Per System** screen are:

Emergency

Analog Signaling Type - Selects the signaling type (DTMF or MDC) used for emergency calls and ANI on analog channels on the system. MDC selects the MDC1200 Motorola signaling protocol. The DTMF and MDC IDs are programmed on the **Radio Wide** Conventional screen (see Section 5.1.1), emergency and some ANI information is programmed on this screen, and ANI is enabled on the analog channel screen (see Section 5.3.3).

Emergency Alarm - If this box is checked, emergency alarms are sent by pressing the Emergency option switch. In the Project 25 mode, an emergency alarm is a special Project 25 data transmission. In the analog mode, it is a DTMF or MDC Emergency ID that is sent (see preceding Analog Signaling Type). This ID is programmed on the Conventional **Radio Wide** screen described in Section 5.1.1.

“Normal/Silent” - When “Normal” is selected and an emergency alarm is sent, the red transmit indicator lights, an emergency tone sounds, and EMERGNCY flashes in the display. EMERGNCY continues to flash until power is cycled, the channel is changed, or the Emergency switch is pressed and held. If “Silent” is programmed, none of these indications occur.

Acknowledge Alert Tone - If selected, an alert tone sounds when the emergency alarm is acknowledged by the dispatcher (DTMF only).

Emergency Call - Digital - Enables Emergency Calls on conventional Project 25 channels. When the Emergency button and then the PTT switch are pressed, an emergency call is transmitted. To exit the emergency mode, cycle power or press and hold the Emergency switch.

Emergency ANI Call - Analog - Enables Emergency Calls on conventional analog channels. When the Emergency button and then the PTT switch are pressed, the Emergency DTMF code is sent every transmission (in place of the DTMF PTT ID if applicable). To exit the emergency mode, cycle power or press and hold the Emergency switch.

Emergency Hot Mic - When this box is checked and an emergency call is sent by pressing the Emergency switch, automatic transmitting occurs with the microphone audio unmuted (without user intervention) for the time specified by the following Emergency Hot Mic Time. If it is not checked or if an emergency call is not selected, automatic transmissions do not occur. This feature is initiated only by the first press of the Emergency switch. Subsequent presses do not trigger automatic transmissions. To reset this function, power must be cycled.

(Emergency) Hot Mic Time - Defines the period during which automatic transmissions occur. Times of 10-120 seconds in ten-second steps can be selected.

No Rx Activity during Emergency - When this box is checked, the following receive indications are disabled in the emergency mode: receive audio, receive LED, receive icons.

ANI

Analog Signaling Type - Selects the signaling type (DTMF or MDC) used for emergency calls and ANI on analog channels on the system. MDC selects the MDC1200 Motorola signaling protocol. The DTMF and MDC IDs are programmed on the **Radio Wide** Conventional screen (see Section 5.1.1), emergency and some ANI information is programmed on this screen, and ANI is enabled on the analog channel screen (see Section 5.3.3.1).

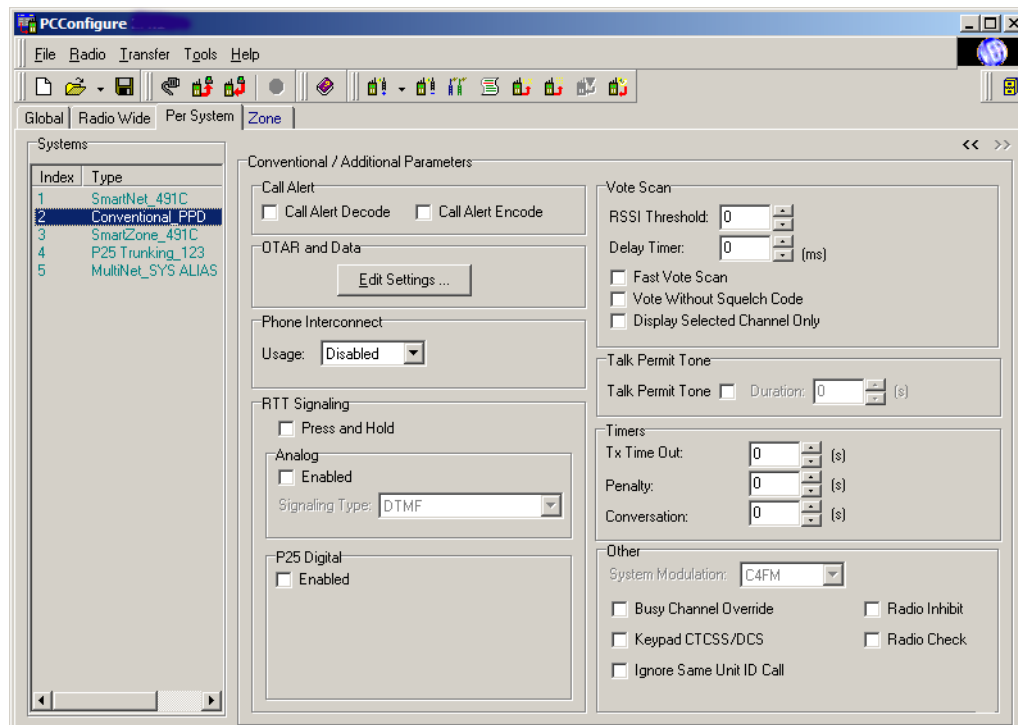
Note *The type of ANI (DTMF or MDC) is selected by the preceding Analog Signaling Type. DTMF PTT and MDC IDs are programmed on the **Radio Wide** Conventional screen, and pre and post ANI is enabled on the analog channel screen.*

Individual (Unit) Call List Settings (Project 25 Only)

Encryption Key ID - Selects the location from 0-15 (PID/ASN mode) or 1-16 (SLN/CKR mode) of the key used for secure individual calls on the system if applicable.

An additional conventional system screen is opened/closed by clicking the << >> buttons in the upper right corner of the screen. The following additional parameters are then displayed:

Figure 5.4 Conventional System Additional Parameters



Call Alert (Project 25 Only)

Call Alert Decode - If selected, enables call alert messages (pages) to be received.

Call Alert Encode - If selected, enables call alert messages (pages) to be sent.

OTAR and Data Settings

Tip You must select the SLN (CKR) key management mode on Page 2 of the **Global** screen to select the OTAR and Data parameters which follow.

Edit Settings - Clicking the **Edit Settings ...** button displays the following screen which programs various OTAR and Project 25 data parameters:

Figure 5.5 OTAR and Data Settings Screen

OTAR

OTAR Enabled - Select “On” to enable OTAR (Over-the-Air Rekeying) of encryption keys. Select “Off” to disable this feature.

Rekey Request Time Out - When rekeying is initiated by the radio (OTAR Rekey Request message sent), this setting determines how long the radio waits for a response from the Key Management Facility (KMF). Times of 20-180 seconds can be programmed.

Rx Security Level - When Enhanced is selected, only encrypted and authenticated Key Management Messages (KMMs) from the KMF are accepted (except for warm-start, which is authenticated only). If Basic is selected, any KMM is accepted that is in a format allowed by the OTAR standard.

Tx Security Level - When Enhanced is selected, all OTAR procedures originating from the radio are encrypted and authenticated. If they cannot be encrypted and authenticated, the KMM will not be sent. When Basic is selected, the radio always sends KMMs in the clear (if the OTAR standard allows them to be unencrypted and unauthenticated).

Note *Under Conventional OTAR and Data Settings, various fields are grayed out because they are not implemented in conventional mode.*

Originating Response Kind - Selects if a response is required from the KMF to outgoing messages. If “Kind 1-Unconfirmed” is selected, no response is requested, and if “Kind 3-Confirmed” is selected, and immediate response is requested.

Data/SNDCP (Simple Network Data Control Protocol)

Data Registration Enabled - Select “On” if OTAR is used. The radio then registers with the data system on a channel change (Project 25 channels only).

CAI Data Max Tx Attempts - Selects the maximum number of times the radio attempts to send a Common Air Interface (CAI) data packet transmission. Retrys continue until it receives an acknowledgement confirming the successful receipt of transmission, or until the selected amount of transmit attempts is reached.

Response Timer - Selects the amount of time the radio waits for an acknowledgement that a CAI transmission is successful before resending.

Under Conventional OTAR and Data Settings, the following are grayed out because SNDCP is not implemented in conventional mode:

SNDCP Activation Wait Timer - This controls the time that a radio waits for the KMF to respond to a SNDCP context activation request.

SNDCP Dwell Timer - Currently not implemented

Rx Interrupts Data. - When checked, a voice call can interrupt data.

Subscriber IP Address - Currently not used.

Mobile Computer IP - Currently not used.

Tx Limited Patience - Selects the amount of time radio attempts to transmit a common air interface packet. Once time expires, radio ceases transmission. Times of 1 to 255 seconds or infinite, in increments of one second. The default is infinite.

Min Response Timer - Selects the minimum amount of time that the radio waits for an acknowledgement of a successful CAI to be sent across the channel. Times of 50 to 2000 msec., in increments of 50 msec. The default is 700 msec.

Frame Sync Seek Period - Selects the amount of time the radio listens for a frame sync sequence before a packet is transmitted. Times of 0-5000 msec., in increments of 50 msec. The default is 750 msec.

Tx Short Random Range - Selects the maximum amount of time the radio waits to transmit once the first qualified FS is received indicating the channel is clear. Times of 50 to 500 msec., in increments of 50 msec. The default is 50 msec.

Tx Long Random Range - Selects the upper range of the random range. When the radio detects a busy, the radio uses a random time within this range (Back off delay) to determine when to retransmit the packet. Times of 50 to 5000 msec., in increments of 50 msec. The default is 2000 msec.

Tx Response Random Range - Selects amount of time radio waits before rechecking a channel's status once a busy channel status symbol has been received. Only applies to ACKs. Times of 50 to 1000 msec., in increments of 50 msec. Default is 1000 msec.

Remaining fields on the second page of the **Per System** screen include:

Phone Interconnect (Project 25 Conventional Only)

Usage

“Disabled” - Phone calls cannot be placed or received.

“Answer Only” - Phone calls can be received but not placed.

“List Only” - Phone calls can be placed and received, and numbers can be recalled from a preprogrammed list only.

“Unlimited” - Private calls can be placed and received, and numbers can be recalled from a preprogrammed list or dialed using a keypad. With 5300 radios, this mode is supported only when the HHC control unit is used. Standard 5300 front and remote models do not support number dialing.

RTT Signaling - Request to Talk (RTT) is used to alert the OCC operator that a unit is requesting to speak with the operator. In some cases Automatic Number Identification (ANI) is utilized to permit OCC operator identification of unit calling. Each base, mobile and portable radio transmits an encoded signal which is decoded into a unit identification and is displayed at the operator’s console position. Priority capabilities permit a member to signal an emergency condition to the commenter by pushing one button.

Press and Hold - The time it takes to activate RTT Signaling.

Analog

Enabled - Enabled if a conventional analog channel.

Signaling Type - DTMF, MDC 1200, Single Tone Encoder, Five Tone Encoder.

P25 Digital

Enabled - Enabled if a digital channel.

Vote Scan - This option must be purchased. Scan based on received signal strength. Please refer to Section 9.4 for instructions to program this feature.

RSSI Threshold - Sets the Receive Signal Strength Indicator (RSSI) levels that determine when searching for and switching to another site occurs.

Delay Timer - A delay that starts once a valid RF signal is received. After the delay timer has elapsed, an RSSI measurement is made.

Fast Vote Scan - A feature that is selected and if the signal strength level for the current repeater is above the RSSI Threshold setting, no additional voting will occur and the current repeater will be used.

Vote Without Squelch Code - If enabled, the CTSS/DCS setting will be ignored when determining which repeater to use.

Display Selected Channel Only - Selecting this field forces the radio to display the selected channel and to not display the repeater ID used once it is voted.

Talk Permit Tone - An audible tone alerting the user that it is OK to talk.

Duration - The amount of time that the tone sounds.

Timers

Tx Time Out - This timer limits the length of individual transmissions. Times up to three minutes, 45 seconds can be programmed in 15-second steps.

Penalty - This timer disables transmitting after the time-out timer disables the transmitter. Times up to three minutes, 45 seconds can be programmed in 15-second steps.

Conversation - This timer limits the total length of a conversation. Times up to 7.5 minutes can be programmed in 0.5-minute steps.

Other

System Modulation - Reserved for future use.

Busy Channel Override - If selected, the busy channel lockout feature can be overridden by quickly releasing and then pressing the PTT switch.

Keypad CTCSS/DCS (51xx Only) - If selected, a code for the selected channel can be directly selected from the programmed CTCSS/DCS/NAC list using the keypad. For example, pressing the “3” key selects code number 3 from the table. No other functions can then be assigned to the keys. If this is not selected, these codes can be selected only by the option button or menu parameter for that function.

Ignore Same Unit ID Call - This feature is part of the Mute/Unmute rules in place for subscriber products. If this box is checked, the radio will not unmute on traffic that is from a subscriber with the same digital unit ID. If not selected, the radio does not recognize the conventional “Digital Unit ID” when receiving traffic and will open for any traffic.

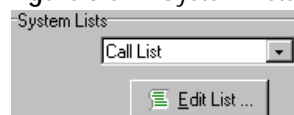
Radio Inhibit (Project 25 only) - If selected, the dispatcher can send a command which disables the radio.

Radio Check (Project 25 only) - If selected, the dispatcher can send a message requesting a response from the radio (to check if it is in operation, for example).

5.2.2 Conventional System Lists

To program the various conventional system lists select them in the **System Lists** drop-down list on the Conventional **Per System** screen shown Figure 5.2 and click the **Edit List** button. Descriptions of the various lists and the information they program follow. Figure 5.6 shows the drop-down **Systems List**.

Figure 5.6 System Lists Drop-down List



The following system lists may be selected:

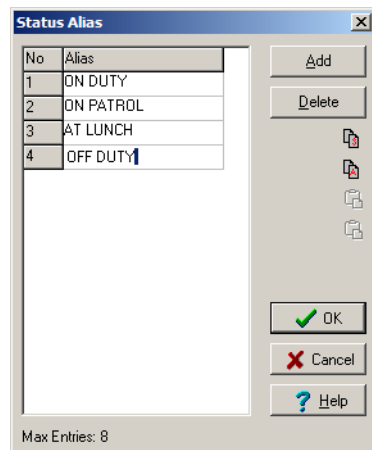
- Status Alias List (Project 25 Only)

- Message Alias List (Project 25 Only)
- Call List (Project 25 Only)
- Talk Group List (Project 25 Only)
- Priority Scan List
- CTCSS/DCS/NAC List
- User Group ID List* (Project 25 Only)
- Phone Access Code List (Project 25 Only)
- Phone List (Project 25 Only)

5.2.2.1 Status Alias List (Project 25 Only)

The Status Alias List screen which follows programs the alias for each of up to eight status conditions that can be sent. The meaning of each status number is defined by the system manager.

Figure 5.7 Status Alias Screen



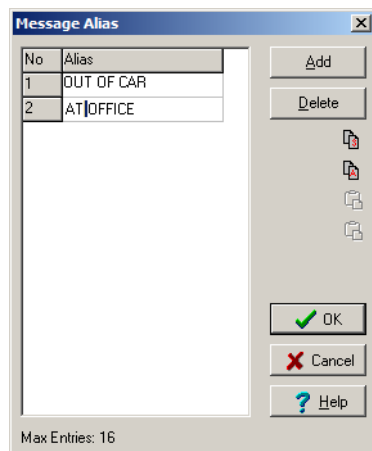
To display this screen, on the Conventional **Per System** screen, select “Status Alias List” in the drop-down list and then click the  **Edit List ...** button.

To add an alias, click the Add button, and to delete an alias, simply select it and click the Delete button. To edit an alias, select it and change it as desired. Up to ten characters can be entered that identify the status. This identification is displayed when the user selects a status condition.

5.2.2.2 Message Alias List (Project 25 Only)

The Message Alias List screen shown in Figure 5.8 associates an alias (name) with each message number. The meaning of each message number is defined by the system manager.

Figure 5.8 Message Alias List Screen



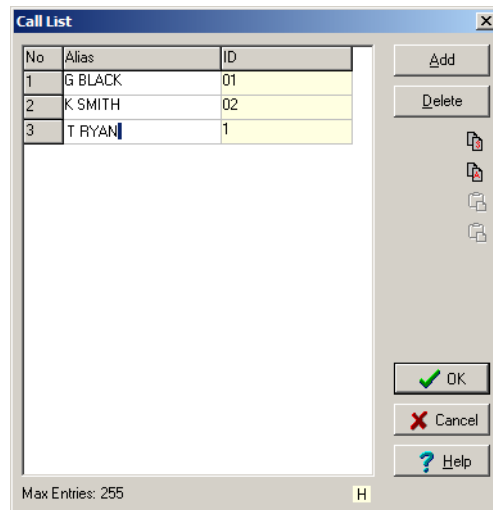
To display this screen, on the Conventional **Per System** screen, select Message Alias List in the drop-down list and then click the  **Edit List ...** button.

To add an alias, click the Add button, and to delete an alias, simply select it and click the Delete button. To edit an alias, select it and change it as desired. Up to ten characters can be entered that identify the status. This identification is displayed when the user selects a message.

5.2.2.3 Call List (Project 25 Only)

The Call List screen which follows sets up the IDs used to place individual calls on conventional digital (Project 25) channels. This list is not used with conventional analog channels.

Figure 5.9 Call List Screen



To display this screen, on the Conventional **Per System** screen, select Call List in the drop-down list and click the  **Edit List ...** button.

To add a call, click the Add button, and to delete an call, simply select it and click the Delete button. To edit an Alias or ID, select it and enter the desired information as follows:

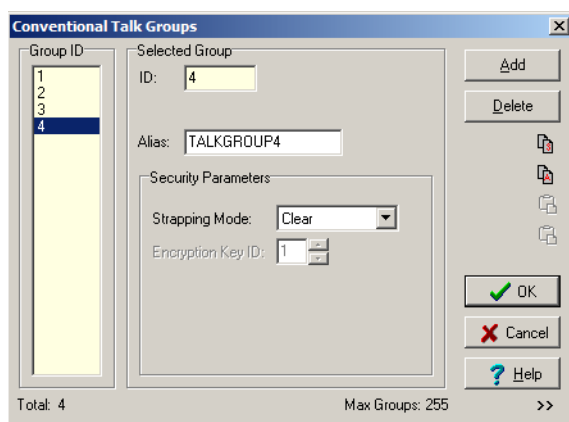
Alias - Up to ten characters can be entered to identify the user being called. This identification and the ID are alternately displayed when the call is selected by the user. Only uppercase letters can be entered, so lowercase letters are automatically converted to uppercase by the program.

ID - This is the ID of the radio being called. Valid entries are 0 - 16,777,216. When receiving a call from a unit with an ID entered on the list, the alias is displayed on the radio instead of the numeric ID.

5.2.2.4 Talk Group List (Project 25 Only)

The Talk Group List screen shown in Figure 5.10 sets up the Talk Groups used to place group calls on conventional digital (Project 25) channels. Talk groups are not used with conventional analog channels. Talk groups are assigned to channels on the channel programming screen described in Section 7.3.3.

Figure 5.10 Talk Group Screen



To display this screen, on the Conventional **Per System** screen, select Talk Group List in the drop-down list and then click the  **Edit List ...** button.

To add a talk group, click the Add button, and to delete an talk group, simply select it and click the Delete button. To edit an ID or Alias, select it and enter the desired information as follows:

ID - Group IDs can be any number from 0-65535. Group IDs can be entered as decimal or hexadecimal numbers depending on which mode is selected.

Alias - The alias is the identification that is displayed when the Talk Group is selected, and up to ten characters can be entered. This drop-down list selects the Talk Group to be edited if applicable.

Security Parameters

“Clear” - All transmissions on the group occur in the clear (unscrambled) mode.

“Secure” - All transmissions occur in the secure (scrambled) mode.

“Selectable” - The clear or secure status of the group is selected by the Clear/Secure option switch.

Encryption Key ID - Selects the location from 0-15 (PID/ASN mode) or 1-16 (SLN/CKR mode) of the key used for secure calls on the group if applicable.


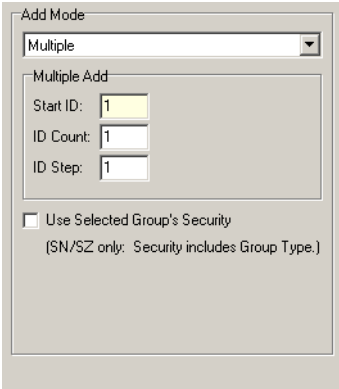
Add Mode - To add an entire block of talk group IDs or a specific ID, click the arrow button  in the lower right corner of the screen and the Talk Group screen is expanded and the following panel is displayed:

Figure 5.11 Add Mode Screen



Add Mode Drop-down List - “Single” adds the next available ID similar to the preceding “Add” button. “Multiple” adds a block of IDs as follows. To initiate the selected add operation, click the preceding “Add” button. If the specified ID range results in duplicate IDs, an error message is displayed and no IDs are added.

Start ID - Specifies the starting ID of the block.

ID Count - Specifies the number of IDs to be added.

ID Step - Specifies if consecutive IDs are added or some other step rate is used.

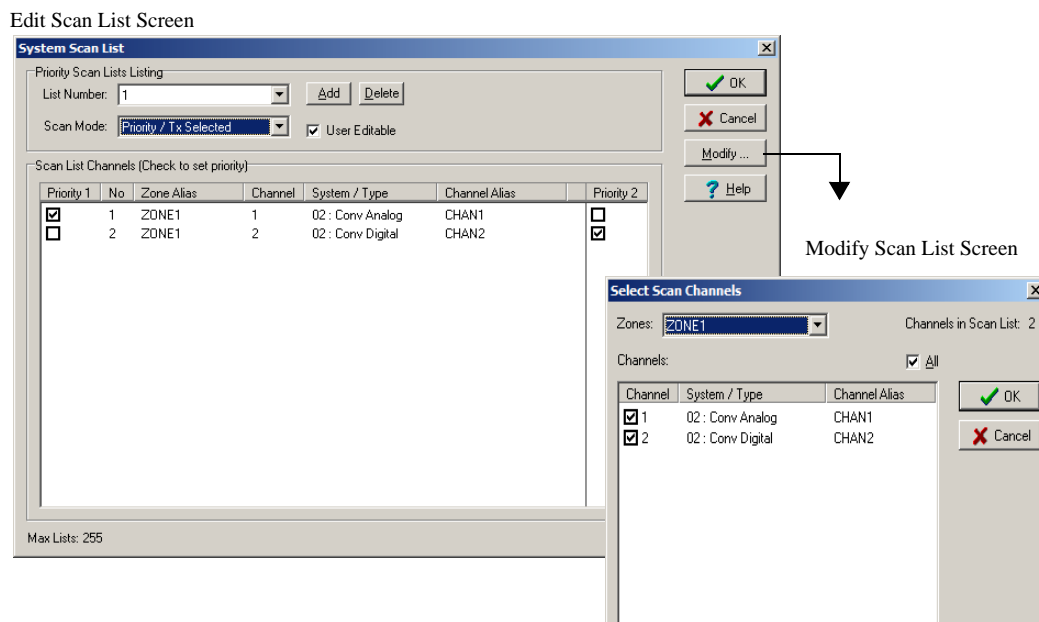
For example, if Start ID = 10, ID Count = 5, and ID Step = 10, the IDs added are 10, 20, 30, 40 and 50.

Use Selected Group’s Security - When selected, the added groups are automatically programmed with the Strapping Mode and Encryption Key ID of the selected group.

5.2.2.5 Priority Scan List

Note *It may be necessary to define specific channel parameters before programming the conventional scan lists as follows (see Section 5.3.3.1).*

Figure 5.12 Priority (Standard) Scan List Programming Screens



This displays the Priority (Standard) Scan List screen (shown in Figure 5.12). This screen programs the priority scan lists that are selected on the system.

List Number - This drop-down list selects which of the scan lists to program. Click the “Add” button to add a scan list and “Delete” to delete a scan list.

User Editable - If this box is checked, user editing of the scan list is allowed. The Scan Edit function switch is then required. User editing can be enabled or disabled on each scan list.

Note *With the 5100 and 5300, Priority 1 and 2 channels can be programmed. The Priority 1 channel is sampled while listening to a call on the Priority 2 channel but not vice versa.*

Scan Mode - Sets the channel on which transmissions occur when the PTT switch is pressed while scanning. A different mode can be programmed for each scan list. In addition, it selects if priority sampling is used and also the type of priority channel. The following modes are available:

“No Priority” - Priority sampling does not occur (all channels are scanned in sequence). The radio transmits on the selected channel.

“Priority/Tx Selected” - Priority sampling occurs and the priority channel(s) are those programmed in the selected scan list. The radio transmits on the selected channel.

“Priority/Tx Priority (1)” - Priority sampling occurs and the priority channel(s) are programmed in the selected scan list. The radio transmits on the priority (1) channel.

“Priority (1) on Sel Chan” - The priority (1) channel is always the selected channel. The radio transmits on the selected channel.

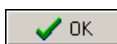
“Talkback Scan” - No priority sampling occurs. The radio transmits on the channel of a call while scanning is halted. Then when scanning resumes, it transmits on the selected channel.

“Vote Scan” - Scan based on received signal strength. This option may be purchased. Please refer to Section 9.4 for instructions to program this feature.

If the “Priority/Tx Priority” or “Priority/Tx Selected” mode is programmed, you must choose the priority channel for the scan list. To do this, click the box next to the desired channel. Select the Priority 1 channel in the Priority 1 column and if a Priority 2 channel is also used, select it in the Priority 2 column.



(Modify) - To add or delete channels from a list, click this button to display the Modify Scan List screen shown in the preceding illustration. Select the channels from each zone that are to be included in the selected list (up to 16 channels maximum).



(OK) - Clicking this button closes the screen and saves the changes.



(Cancel) - Clicking this button closes the screen without saving any changes.

5.2.2.6 CTCSS/DCS/NAC List

Use Figure 5.13 to program the list of CTCSS/DCS (Call Guard) and NAC (Project 25) codes that can be selected if the Selective Squelch option switch is programmed or the Keypad CTCSS/DCS function which follows is programmed.

Figure 5.13 CTCSS/DCS/NAC List Screen

No	Tx CTCSS/DCS	Tx NAC	Rx CTCSS/DCS	Rx NAC
1	67.0 (CTCSS)	659 (D)/ 293 (H)	67.0 (CTCSS)	659 (D)/ 293 (H)
2	69.3 (CTCSS)	659 (D)/ 293 (H)	69.3 (CTCSS)	659 (D)/ 293 (H)

Total: 2 Max Entries: 64

To add a code to the list, click the Add button and an additional screen like the one shown in Figure 5.14 is displayed. Different codes can be programmed for the transmit and receive modes by selecting the mode in the drop-down list. In addition, carrier squelch can be programmed instead of a CTCSS/DCS code by unchecking the CTCSS/DCS box.

Figure 5.14 Add CTCSS/DCS/NAC

To change a code, select it and then click the Modify button. A maximum of 64 different codes can be programmed. A CTCSS/DCS code table is shown on Page 16-1.

Figure 5.15 Edit CTCSS/DCS/NAC

5.2.2.7 User Group ID List (Project 25 Only)

Use the User Group ID List screen shown in Figure 5.16 to program aliases that can be displayed if a call is received on a talk group ID within the programmed block. For example, with the following screen, if a group call is received on group IDs 234-264, the alias “Fire” can be displayed. The display of this alias is controlled by the “User Group ID” parameter on the **Radio Wide** screen.

Figure 5.16 User Group ID List Screen

No	Alias	Start ID	Stop ID
1	FIRE	235	244
2	POLICE	255	264

5.2.2.8 Phone Access Code List (Project 25 Only)

Use the Phone Access Code List screen shown in Figure 5.17 to program sets of predefined DTMF access and de-access codes needed to make interconnect telephone calls on Project 25 channels. The code must be entered before the actual telephone number. They can be up to four digits in length, and the default code is *1P#. The access code is selected from this list on the conventional digital channel screen (see Section 5.3.3.2).

Figure 5.17 Phone Access Code List Screen

The screenshot shows a window titled "Phone Access Codes" with a table and several control buttons. The table has three columns: "No", "Access Code", and "Deaccess Code". The first row contains the values "1", "*1P#", and "*1P#" respectively. To the right of the table are buttons for "Add", "Delete", and three icons representing different file operations. At the bottom right are "OK", "Cancel", and "Help" buttons. The status bar at the bottom left says "Max Entries: 16" and there is a small "H" icon at the bottom right.

No	Access Code	Deaccess Code
1	*1P#	*1P#

5.2.2.9 Phone List (Project 25 Only)


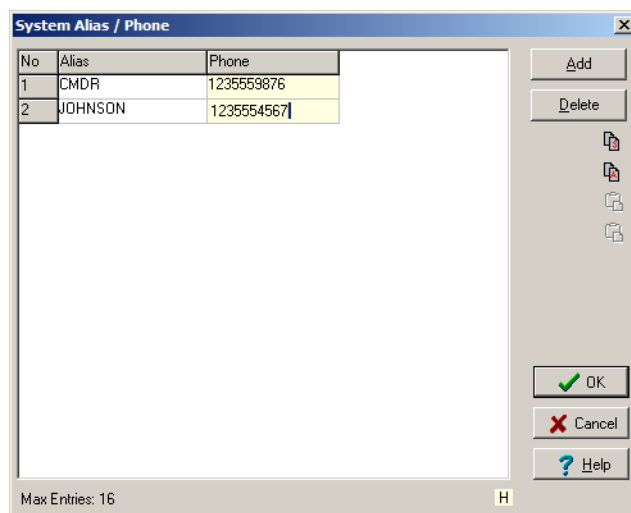
Use the Phone List screen shown in Figure 5.18 to program the telephone number list used for placing telephone calls if applicable. A maximum of 16 numbers can be programmed. To display this screen, on the Conventional **Per System** screen, select Phone List in the drop-down list and then click the  button.

Figure 5.18 Phone List Screen



To add a number, click the Add button, and to delete a number, simply select it and click the Delete button. To edit an alias or number, select it and enter the desired information as follows:

Alias - Up to ten characters can be entered to identify the number being called. This identification is displayed when the number to be called is selected by the user from the list. Only uppercase letters can be entered, so lowercase letters are automatically converted to uppercase by the program.

ID - This is the telephone number dialed when the location is selected. Numbers up to sixteen digits can be entered. A pause is entered by “p” or “P” and counts as one digit.

5.3 Setting Up Zones and Channels

5.3.1 Setting Up Zones

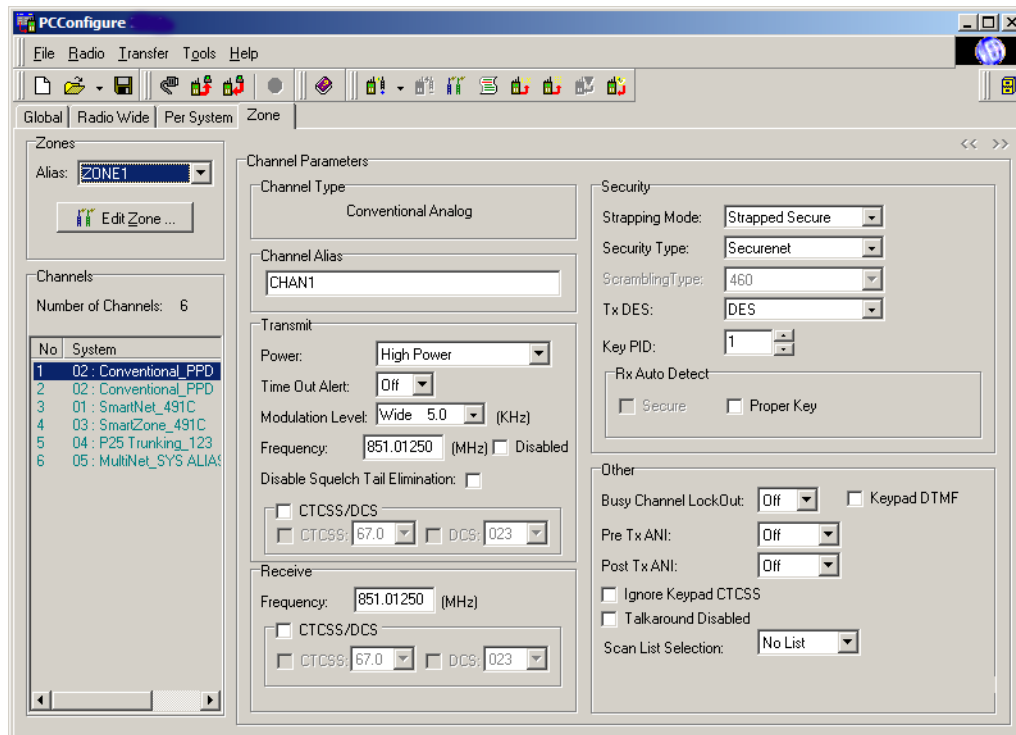
This section describes how to set-up zones and assign channels to each zone. A zone can include up to 16 channels of any type (conventional analog, Project 25 conventional, SMARTNET/SmartZone, Project 25 Trunked, or Multi-Net).

With the 5100 portable/5300 mobile, you can program a maximum of 32 zones for up to 512 channels if you enable the “512 Talkgroups/Channels” option. Refer to the **Transfer → Read Options** screen to see if this feature is enabled for your system. Otherwise, you can program a maximum of 16 zones.

5.3.1.1 Setup Procedure

- 1 Select the **Zone** tab to display the Zone screen. (This screen varies according to the type of system. Figure 5.19 shows a conventional analog Zone screen.)

Figure 5.19 Zone Screen





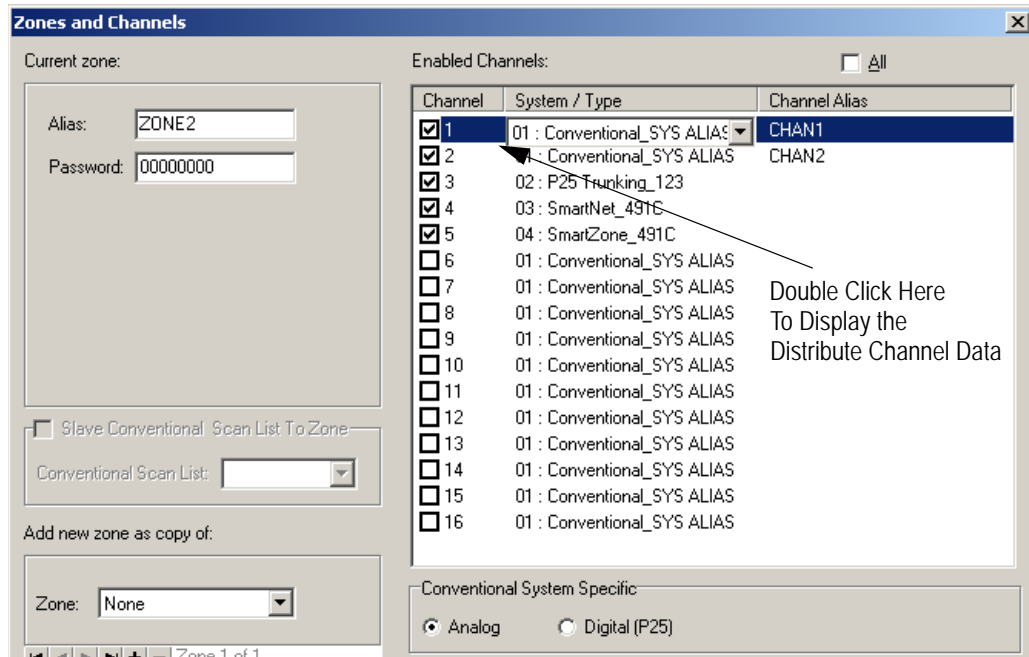






Click  in the upper left corner of the screen to display the **Zones and Channels** screen shown in Figure 5.20. Another way to do this is to click  in the toolbar.

Figure 5.20 Zones and Channels Screen



Channel	System / Type	Channel Alias
<input checked="" type="checkbox"/> 1	01 : Conventional_SYS ALIAS	CHAN1
<input checked="" type="checkbox"/> 2	01 : Conventional_SYS ALIAS	CHAN2
<input checked="" type="checkbox"/> 3	02 : P25 Trunking_123	
<input checked="" type="checkbox"/> 4	03 : SmartNet_491C	
<input checked="" type="checkbox"/> 5	04 : SmartZone_491C	
<input type="checkbox"/> 6	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 7	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 8	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 9	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 10	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 11	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 12	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 13	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 14	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 15	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 16	01 : Conventional_SYS ALIAS	

- 1 To add a new blank zone, select “None” in the Zone drop-down list and then click the  button. To make a copy of a current zone, select the desired zone in the Zone drop-down list instead. To delete the current zone, click the  button.
- 2 To display the first zone, click ; the last zone ; the previous zone ; and the next zone, .
- 3 Program the alias (identification) that is displays briefly when you select the zone. To do this, enter a maximum of ten characters in the **Alias** box.
- 4 You can program a zone password that you must enter to perform keypad programming of the zone. Refer to Section 11. To program this password, enter any eight numbers from 0-9. If you do not wish to program this password for the zone, simply leave this field all zeros.

5.3.1.2 Linking Conventional Scan Lists to Zones

You program conventional systems on the **Per System** screen with a default scan list that all channels in a given system can normally select. Refer to Section 5.2.1. However, you can select this parameter to link a particular conventional scan list to the zone. This then becomes the default list for all conventional channels in that zone. It overrides the system default list programming.

5.3.2 Setting Up Channels

Note When you assign a channel to a zone, you also select the system of the channel. Therefore, before assigning a channel to a zone, set up all necessary systems as described in Section 1.10.

Set up channels by assigning them to a zone in the **Zones and Channels** screen shown in Figure 5.20. Proceed as follows to set up any type of channel.



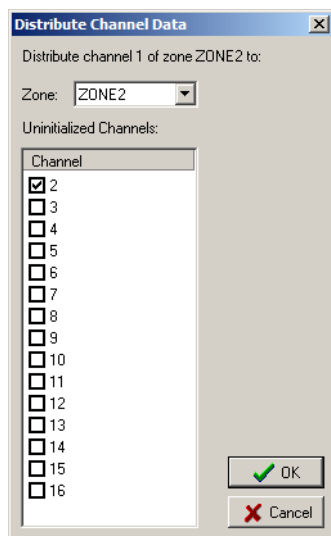
- 1 Select the **Zone** screen (see Figure 5.19) and then click  to display the **Zones and Channels** screen shown in Figure 5.20. Another way to do this is to click  in the toolbar.
- 2 Select the desired zone as described in the preceding section.
- 3 To add a channel to the displayed zone, check the applicable box in the **Channel** column. To select or deselect all channels in the box, check or uncheck the **All** box.
- 4 To assign the channel to a system (if applicable), select the drop-down list in the **System/Type** column and select the desired system.
- 5 For Conventional channels, also select the channel type of each channel by clicking **Analog** or **Digital (Project 25)** in the **Conventional System Specific** box.
- 6 To copy an enabled channel to unprogrammed channels of the current zone or other zones, double click the shaded area of the channel as shown in Figure 5.20. The **Distribute Channel Data** screen then appears. Select the desired channels from this screen.

Figure 5.21 Distribute Channel Data



- 7 Repeat the preceding steps until the you have set up desired channels in each zone.

8 To program individual system and channel information, refer to Section 5.3.3.

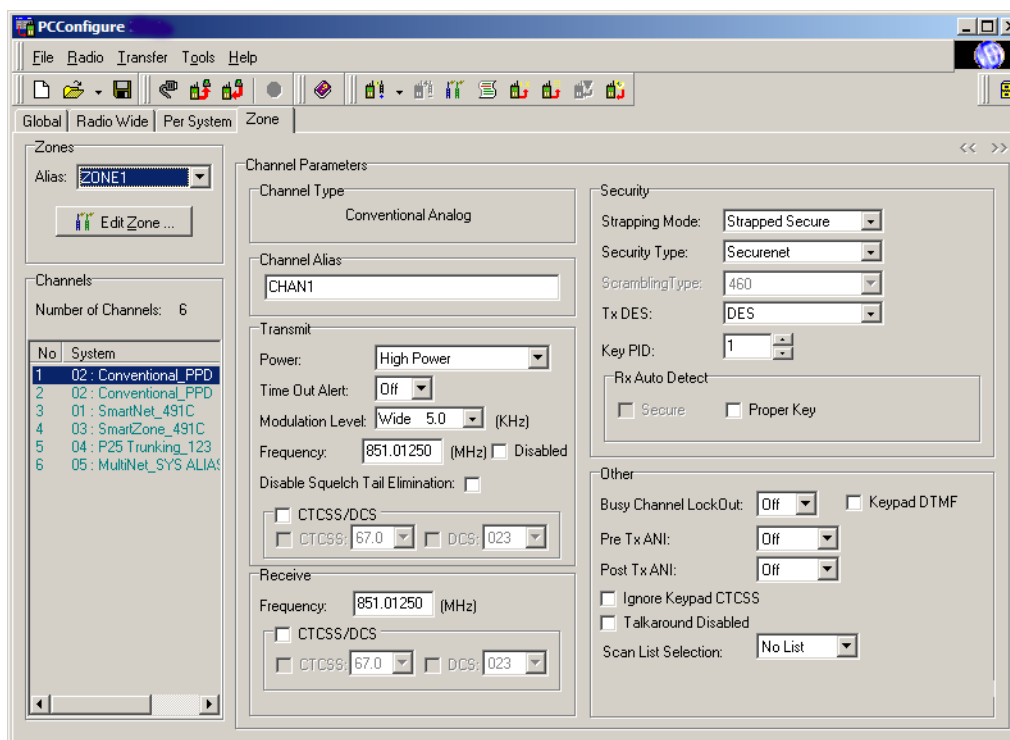
5.3.3 Programming Conventional Channel Parameters

After the desired channels have been set up as described in Section 5.3.2, you can program individual channel parameters. Select the **Zone** screen shown in Figure 5.22 and then select the desired Zone using the drop-down list in the “Zones” box. Screens which program individual channel parameters are selected by clicking the channel in the “Channels” box. See Figure 5.22 to set parameters for a Conventional Analog channel and Figure 5.23 to set parameters for a Conventional Digital channel.

5.3.3.1 Conventional Analog Channel Parameters

Select the system from the Channels section on the left side of the screen. The following screen is used to set channel parameters for a Conventional Analog system.

Figure 5.22 Conventional Analog Channel Screen



The parameters displayed when a Conventional Analog channel is selected are as follows.

Channel Type - Indicates the type of channel (Conventional Analog or Conventional Digital) that is currently selected in the “Channels” box.

Channel Alias - Programs the alias (identification) that is displayed when the channel is selected.

Transmit

Power - Fixes the transmit power on the channel for the high or low level or makes it selectable (the high/low power option switch is then required).

Time Out - Enables or disables the transmit time-out timer on the channel. The time-out timer time is programmed on the **Per System** programming screen (see Section 5.2.1).

Modulation Level - This selects if the channel modulation is wide band (5 kHz), narrowband (2.5 kHz), or NPSPAC (4 kHz). NPSPAC (public safety) modulation applies to 800 MHz models only.

Frequency - Programs the transmit frequency of the channel.

Disabled - Checking this box disables transmitting on the channel so that it is receive only.

Disable Squelch Tail Elimination - The 5100/5300 radios currently send a CTCSS reverse burst or CDCSS turn off code at the end of a transmission. This helps the repeater squelch sooner and eliminates the squelch tail often found in analog transmissions. Check this box to turn off the reverse burst feature so that the squelch tail is not eliminated.

CTCSS/DCS - Checking this box enables Call Guard (CTCSS/DCS) squelch control transmission on the channel. If this box is not checked, no code is transmitted and squelch is carrier controlled.

CTCSS - If this box is checked, tone Call Guard (CTCSS) squelch control is used and the desired tone is selected by the drop-down list.

Note *A CTCSS/DCS code table is shown on Page 16-1.*

DCS - If this box is checked, digital Call Guard (DCS) squelch control is used and the desired code is selected by the drop-down list.

Receive

Frequency - Programs the receive frequency of the channel.

CTCSS/DCS - Checking this box enables Call Guard (CTCSS/DCS) squelch control on the channel. If this box is not checked, no squelch control coding is used, and squelch is carrier controlled.

CTCSS - If this box is checked, tone Call Guard (CTCSS) squelch control is used and the desired tone is selected by the drop-down list.

DCS - If this box is checked, digital Call Guard (DCS) squelch control is used and the desired code is selected by the drop-down list.

Security

Note *Voice encryption is an optional feature that requires factory programming and possibly special hardware.*

Strapping Mode

“Strapped Clear” - All transmissions on the channel occur in the clear (unencrypted) mode.

“Strapped Secure” - All transmissions occur in the secure (encrypted) mode selected by Security Type.

“Switched” - The clear or secure status of the channel is selected by the Clear/Secure function switch.

Security Type

“Securenet” - Selects Motorola SecureNet™ DES type secure communication when either the Strapped Secure or Switched strapping modes are selected.

“Scrambling” - Selects Transcrypt 460 scrambling when either the Strapped Secure or Switched strapping modes are selected. (Not currently supported.)

Scrambling Type - (Not currently supported.) When the Transcrypt 460 scrambling type is selected, 460 scrambling is always enabled.

Tx DES - Enables DES type encryption mode.

Key PID - Selects the location from 0-15 (PID/ASN mode) or 1-16 (SLN/CKR mode) of the key used for secure calls on the channel if applicable.

Rx Auto Detect

Secure - With the SecureNet protocol, select “Secure” to enable automatic detection of encrypted receive signals (not available with 5100 models). This may increase the response time of the radio to an incoming signal.

Proper Key - Select “Proper Key” to cause the radio to search the available SecureNet keys until it finds a match for the current transmission.

Other

Busy Channel LockOut

“Off” - Disables this feature.

“Noise” - Transmitting is disabled if a carrier is detected.

“Tone” - Transmitting is disabled if an incorrect Call Guard (CTCSS/DCS) tone or code is detected (one not programmed for current channel).

Keypad DTMF - If this box is checked, manual dialing of numbers using the DTMF keypad is allowed. Only true on a 53xx mobile while using the HHC controller.

Pre Tx ANI - If “Pre Tx” is selected, a DTMF-coded ID is sent at the beginning of each transmission.

Post Tx ANI - If “Post Tx” is selected, a DTMF coded ID is sent at the end of each transmission.

Ignore Keypad CTCSS - If this is checked and a CTCSS/DCS code has been selected from the preprogrammed CTCSS/DCS table by the Selective Squelch Code Select feature, it is ignored and the programmed code for the channel is selected instead.

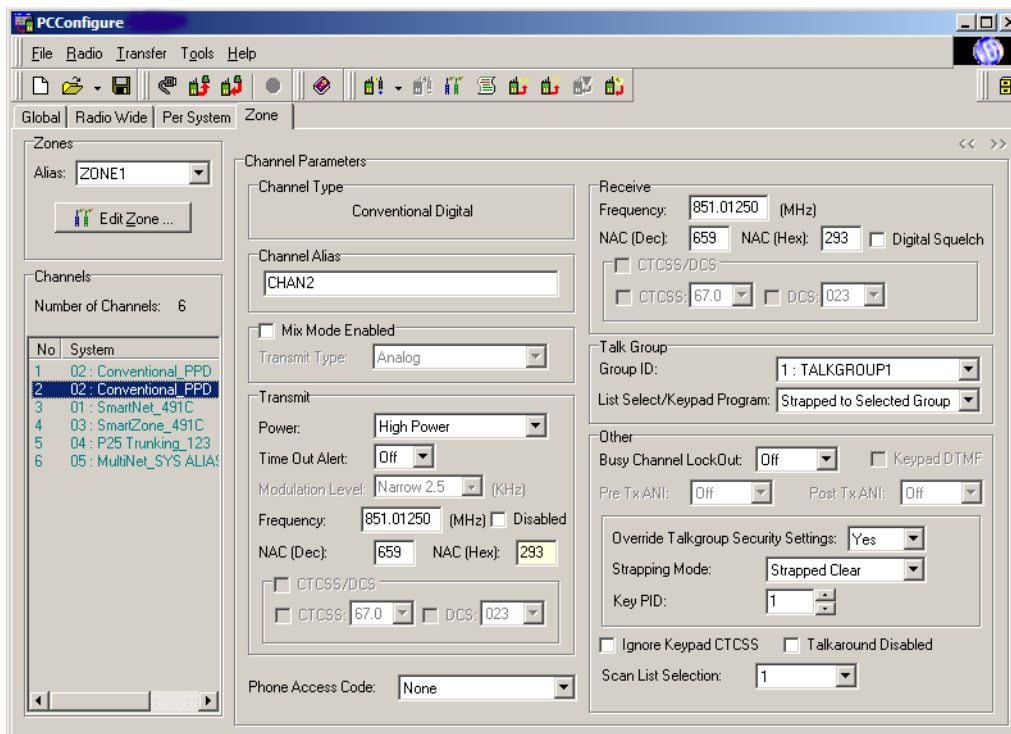
Talkaround Disabled - Set on a per-channel basis: the user has to use the infrastructure if disabled. (Radio to Radio communication is not allowed.)

Scan List Selection - Enter the number of the scan list set with the Vote Scan option.

5.3.3.2 Conventional Digital (Project 25) Channel Parameters

After the desired channels have been set up as described in Section 5.3.2, individual channel parameters can be programmed. Select the **Zone** screen shown in Figure 5.23 and select the desired Zone using the **Alias** drop-down list in the “Zones” box. Screens which program individual channel parameters are selected by clicking the channel in the **Channels** box.

Figure 5.23 Conventional Digital (Project 25) Channel Screen



The parameters displayed when a Conventional Digital channel is selected are as follows. Refer to Section 5.3.3.1 for information on Conventional Analog channels.

Channel Type - Indicates the type of channel (Conventional Analog or Conventional Digital) that is currently selected in the “Channels” box.

Channel Alias - Programs the alias (identification) that is displayed when the channel is selected. Up to ten characters can be programmed.

Mix Mode Enable - Checking this box selects both analog and digital operation on the current channel.

Mixed analog and digital (Project 25) operation can be programmed on a channel. With mixed mode operation, both types of calls can be received, and the Tx Type determines if NAC or CTCSS/DCS is transmitted. With analog operation, channel modulation, coded squelch, and ANI signaling may require programming similar to that described in Section 5.3.3.1.

Transmit Type - When “Analog” is selected, CTCSS/DCS is transmitted, and when “Digital” is selected, NAC is transmitted.

Transmit

Power - Fixes the transmit power on the channel for the high or low level or makes it selectable (the high/low power function switch is then required).

Time Out Alert - Enables or disables the transmit time-out timer on the channel. The time-out timer time is programmed on the **Per System** programming screen (see Section 5.2.1).

Modulation Level - If the Mixed Mode and Transmit Type = Analog is selected, the modulation level is programmed. This selects if the channel modulation is wide band (5 kHz), narrowband (2.5 kHz), or NPSPAC (4 kHz).

Frequency - Programs the transmit frequency of the channel.

Disabled - Checking this box disables transmitting on the channel so that it is receive only.

NAC - Programs the transmit Network Access Code (NAC). These codes can be 0-4095, and either decimal or hexadecimal numbers can be entered.

CTCSS/DCS - If the Mixed Mode and Transmit Type = Analog is selected, the transmit Call Guard (CTCSS/DCS) squelch coding can be programmed (see Section 5.3.3.1).

CTCSS - Select the desired tone from the drop-down list.

Note A CTCSS/DCS code table is shown in Section 16.

DCS - Select the desired code from the drop-down list.

Phone Access Code - Selects the Phone Access Code if telephone calls are placed on the channel. The access codes are programmed by the Phone Access Code system list on the **Per System** screen.

Receive

Frequency - Programs the receive frequency of the channel.

NAC - Programs the receive NAC (Network Access Code). These codes can be 0-4095, and either decimal or hexadecimal numbers can be entered. NAC F7E (hex) is interpreted as a standard code.

Digital Squelch - When checked, carrier squelch is enabled which results in all digital traffic, regardless of NAC or talk group ID, being received. This does not program NAC F7E which is used the same as other NAC codes.

CTCSS/DCS - If the Mixed Mode is selected, the receive Call Guard (CTCSS/DCS) squelch coding can be programmed (see Section 5.3.3.1). Both analog and digital (Project 25) calls can be received in the mixed mode.

CTCSS - Select the desired tone from the drop-down list.

Note A CTCSS/DCS code table is shown on Section 16.

DCS - Select the desired code from the drop-down list.

Talk Group

Group ID - This selects the Project 25 talk group that is assigned to the channel. The talk group includes the Talk Group ID, talk group alias, secure strapping mode, and encryption key address. Talk Groups are programmed in the **Per System** screen (Section 5.2.1).

List Select/Keypad Program

“Strapped To Selected Group” - The talk group on the channel is always the programmed talk group and cannot be changed.

“List Selectable” - The talk group may be changed using the Digital TG Select function button.

Other

Busy Channel LockOut

“Off” - Disables this feature.

“Noise” - Transmitting is disabled if a carrier is detected.

“NAC” - Transmitting is disabled if an incorrect NAC code is detected (or CTCSS/DCS if mixed mode is enabled). An incorrect code is any code not programmed for the current channel.

Keypad DTMF - If this box is checked, manual dialing of numbers using the DTMF keypad is allowed. This is available in the mixed mode only. Only true on a 53xx mobile while using the HHC controller.

Pre Tx ANI - If “Pre Tx” is selected, a DTMF-coded ID is sent at the beginning of each transmission.

Post Tx ANI - If “Post Tx” is selected, a DTMF coded ID is sent at the end of each transmission.

Override Talkgroup Security Settings - This allows the encryption strapping mode and key location to be set on a per channel basis instead of just on a per talk group basis. If “Yes” is selected in the drop-down menu, the selected strapping mode and key

location overrides the talk group programming if applicable (conventional digital channels only).

Strapping Mode

“Strapped Clear” - All transmissions on the channel occur in the clear (unscrambled) mode.

“Strapped Secure” - All transmissions occur in the secure (scrambled) mode selected by Security Type.

“Switched” - The clear or secure status of the channel is selected by the Clear/Secure function switch.

Key PID - Selects the location from 0-15 (PID/ASN mode) or 1-16 (SLN/CKR mode) of the key used for secure calls on the channel if applicable.

Ignore Keypad CTCSS - If this is checked and a CTCSS/DCS code has been selected from the preprogrammed CTCSS/DCS table by the Selective Squelch Code Select feature, it is ignored and the programmed code for the channel is selected instead.

Talkaround Disabled - Set on a per-channel basis: the user has to use the infrastructure if disabled. (Radio to Radio communication is not allowed.)

Scan List Selection - Enter the number of the scan list set with the Vote Scan option.

SMARTNET and SmartZone Systems

6.1 Radio Wide Screen

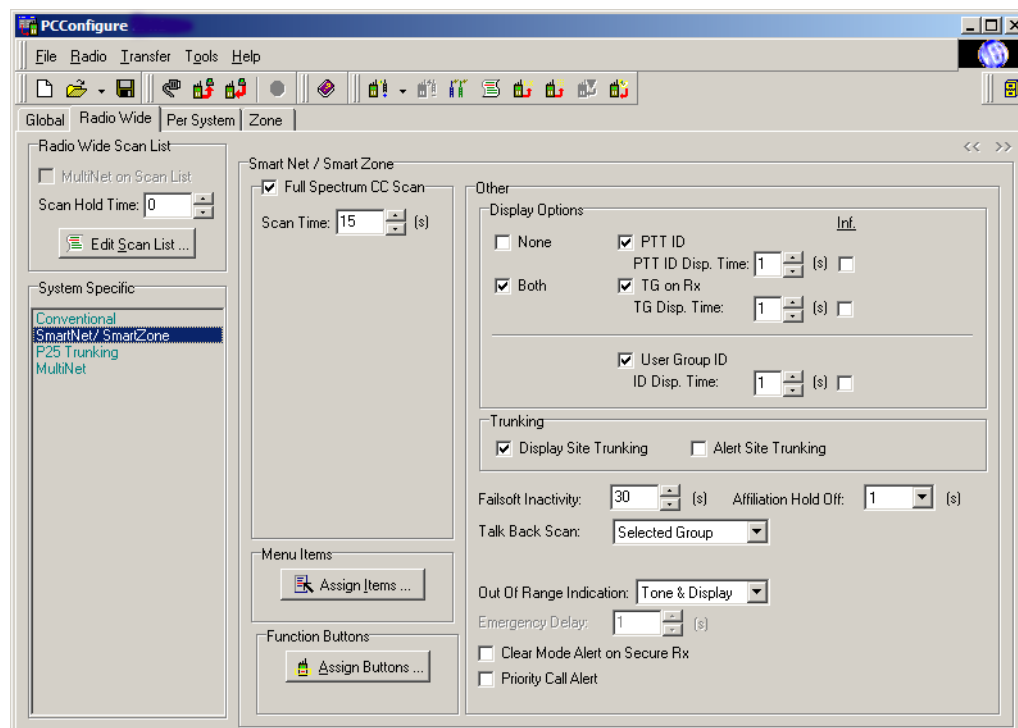
The **Radio Wide** screen programs parameters for all Conventional, Project 25 Trunked, SMARTNET[™]/SmartZone[®], and Multi-Net systems. Areas of the screen common to all protocols are shown in Figure 2.1. A different screen is displayed for each system type. This section contains the instructions to program these parameters for SMARTNET/SmartZone systems.

Note SMARTNET[™]/SmartZone[®] are registered trademarks of Motorola, Inc.

6.1.1 Radio Wide Parameters

Select “SMARTNET/SmartZone” in the **System Specific** box to display the screen shown in Figure 6.1. This screen programs the functions that are the same for all SMARTNET and SmartZone systems.

Figure 6.1 Radio Wide SMARTNET/SmartZone Screen



Full Spectrum CC Scan - After the radio searches all potential control channel frequencies, the radio enters a channel-by-channel search across the full spectrum the radio covers. The timer sets the period of time the radio performs this scan before checking the programmed frequencies again. After the radio checks these frequencies, full spectrum scanning resumes from the previous point where scanning stopped. This cycle repeats until the radio finds a control channel. Checking the box enables full spectrum scan.

Scan Time - Sets the time that full spectrum scanning occurs as just described. The selectable range is 5-31 seconds. The default is five seconds.

Other

Display Options - Select whether anything displays alternately with the selected channel alias or frequency when the radio receives Project 25 group calls.

None - Only the selected channel alias or frequency is displayed.

Both - Both of the following are displayed:

PTT ID - The ID of the mobile placing the call displays. You can program this ID to display for 0.5-7.0 seconds or “infinite”. When you select “infinite”, this ID displays for the entire call and none of the other parameters display.

TG on Rx - The radio displays the alias of the talk group on which the call is being received. You can program this to display for 0.5-7.0 seconds or “infinite” as just described.

User Group ID - If the ID of the call being received is included in a User Group ID list as described in Page 5-21, the alias of that group displays. You can program this to display for 0.5-7.0 seconds or “infinite” as just described.

Trunking

Display Site Trunking - If you select this, “Site Trunking” displays if the affiliated site loses communication with the zone controller and operates in the site trunking mode. This message displays until the zone controller returns to normal operation.

Alert Site Trunking - If you select this, an alert tone sounds when entering the site trunking mode previously described.

Failsoft Inactivity - Programs failsoft operation. If the radio remains inactive (no receive or transmit activity on the channel) while it operates in the failsoft mode for the programmed time, the radio momentarily leaves the failsoft mode and attempts to find a control channel. If you program “0”, the radio does not leave the failsoft mode.

Affiliation Hold Off - With SmartZone operation, this is the delay time that occurs after acquiring the control channel before it sends an affiliation inbound signaling word (ISW). This prevents all radios on the system from sending affiliation ISWs at the same time.

Talk Back Scan - When the radio receives a call while it is scanning, this setting determines the talk group of the radio’s response. You can program the radio to respond on the Selected talk group or the received talk group (Active) group if they are not the same. You program **Scan Hold Time** on the **Per System** screen.

Out Of Range Indication - Selects if the periodic tone sounds, “Out of Rng” (or “NO SYS”) displays, or if both or neither of these indications occur when an out-of-range condition exists.

Clear Mode Alert on Secure Rx - When you select this, a beep sounds when the radio receives a Secure (encrypted) call in the Clear mode on a SMARTNET/SmartZone channel. If you do not select it, no beep sounds when this occurs.

Priority Call Alert - An audible tone tells the user he is receiving priority traffic and not just a standard scan channel. Although this feature is active for all systems, it is particularly applicable for the 5100 ES Model I radios.

6.2 Per System Screens

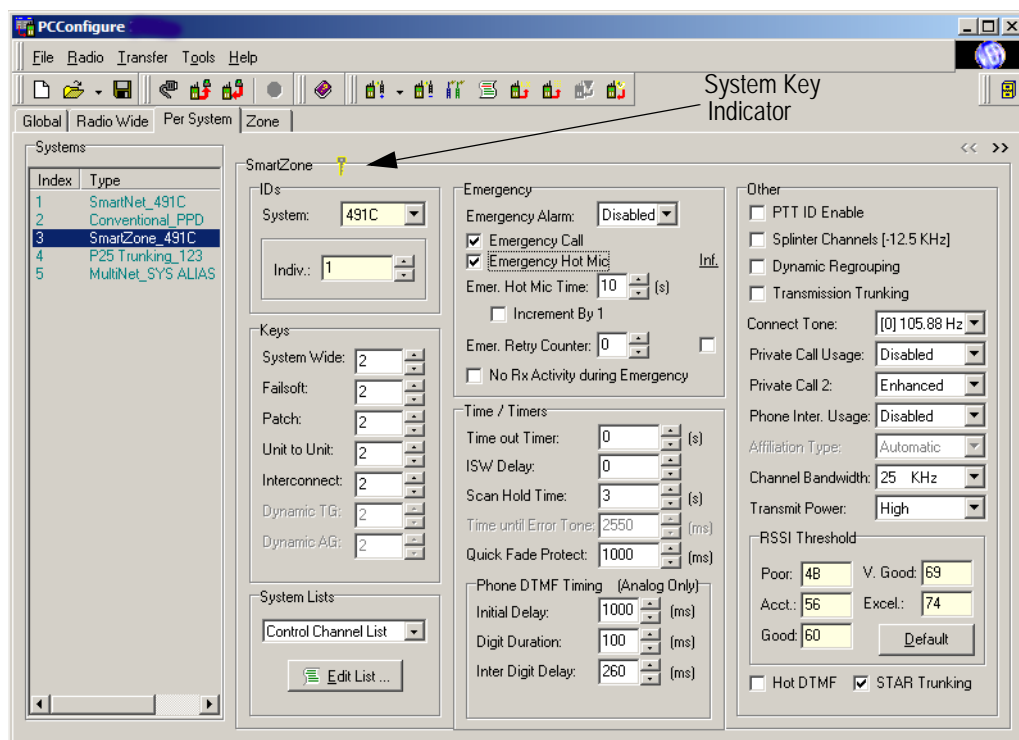
Two screens contain the interface where individual SMARTNET and SmartZone system parameters are programmed. This section contains descriptions of the parameters found on these screens. You can program these parameters after you set-up the desired systems as described in Section 1.10.

Note *Some SMARTNET and SmartZone parameters can be edited only if PC Configure detects the proper system key. PC Configure detects a key if a yellow key icon is indicated as shown in Figure 6.2. If there is a red “X” through this icon, PC Configure does not detect a key. Refer to Section 13 for more information.*

6.2.1 System Parameters: Initial Screen

Figure 6.2 shows the initial SMARTNET and SmartZone system programming screen.

Figure 6.2 SMARTNET and SmartZone System Screen



System - Select the system for which you wish to set parameters.

IDs

Note *You can enter these IDs in either decimal or hexadecimal format as described in Section 1.9.4.*

System - After you have loaded the system key from the *Keys* folder, select the key from the drop-down box. (Refer to the related [Note](#) at beginning of this section.) System ID numbers can be 1 through 65535 or 0001 through FFFF hex. If PC Configure does not detect a valid system key, you can only select the default ID of “1”

Indiv - Uniquely identifies the radio on a particular system. Each radio must have a different Unit ID. Valid Unit IDs are 1 through 65535. If you checked the Hex box, you can enter Indiv as a hexadecimal number instead of a decimal number.

Keys - Programs the following encryption key ID (hardware location) that is used for all except group calls.

System Wide - Key used for system-wide calls (typically originated by the dispatcher). The dispatcher usually originates these calls.

Failsoft - Key used in failsoft conditions.

Patch - Key used in patch calls.

Unit to Unit - Key used for unit-to-unit (private) calls.

Interconnect - Key used for telephone interconnect calls.

Dynamic TG - The talkgroup used when the radio has been dynamically regrouped. Defaulted value.

Dynamic AG - The announcement group used when the radio has been dynamically regrouped. Defaulted value.

System Lists - Refer to Section 6.2.3 for information on these lists.

Emergency

Emergency Alarm

“Disabled” - The radio sends no emergency signal when the user presses the Emergency option switch.

“Normal” - The radio sends an emergency alarm when the user presses the Emergency switch. If you disabled emergency calls, the alarm always occurs on the selected group. If you enabled emergency calls, it occurs—in order of preference—on the emergency group, selected group, and announcement group. When radio sends an emergency signal, the red transmit indicator lights, an emergency tone sounds, and “EMERGENCY” flashes in the display. “EMERGENCY” and the initiating ID continue to flash alternately until power is cycled, the channel is changed, or the radio user presses and holds the Emergency switch.

“Silent” - Same as “Normal” except none of the preceding audio or visual indications occurs.

Emergency Call - When you check this box, if the radio user presses the Emergency option switch and then the PTT switch, an emergency group call transmits on the emergency group. The radio user cancels the emergency mode by cycling power or pressing and holding the emergency switch.

Emergency Hot Mic - When you check this box and the radio user sends an emergency alarm by pressing the Emergency switch, automatic transmitting occurs. The

microphone audio is unmuted (without user intervention) for the time specified by the following **Emergency Hot Mic Time**. If you do not check this or if you do not select either emergency call, automatic transmissions do not occur. This feature initiates only by the first press of the Emergency switch. Subsequent presses do not trigger automatic transmissions. This function resets if the radio user changes the channel.

Emergency Hot Mic Time - Specifies the time period during which transmissions occur. You can select time periods of 10 through 120 seconds in ten-second increments.

Increment by 1 - If the ten-second increment is not desired, check this box to increment by one second.

Emergency Retry Counter - If you check **Inf** (infinite), the radio system repeats emergency calls until they are acknowledged or canceled. If you do not check it, the radio system repeats these calls only the specified number of times.

No Rx Activity during Emergency - When you check this box, the following radio receive indications do not display in the emergency mode: Receive audio, receive LED, and receive icons.

Time/Timers

Time out Timer - This timer determines the maximum time period of a continuous transmission. You can program it for 15 through 225 seconds in 15-second intervals, or you can disable it (0).

ISW Delay Time - Increasing or decreasing this value changes the transmission timing of inbound signaling words (ISWs) relative to the reception of outbound signaling words (OSWs).

Scan Hold Time - Specifies the delay that occurs after the radio no longer receives a message before scanning resumes. You can program times of two through ten seconds. The default is three seconds.

Time until Error Tone - Defaulted value.

Quick Fade Protect - Specifies the time the radio will stay on the control channel when synchronization is lost before re synchronizing. This allows recovery without performing a full re synchronization of the channel.

Phone DTMF Timing (Analog Only)

Initial Delay - Delay from 10 through 500 milliseconds from the time the radio system grants a traffic channel for phone interconnect to the start of the dialing of the phone number.

Digit Duration - Duration from 10 through 500 milliseconds of each phone number digit.

Inter Digit Delay - Delay from 10 through 500 milliseconds between each digit of a phone number.

Other

PTT ID Enable - When selected, the radio can key during the programmed hang time and continue the conversation on the active channel, similar to message trunking. If a

user keys during the hang time, re affiliation with the system occurs before the radio uses the voice channel. The radio then holds the voice channel while this re affiliation occurs. The call connects to the open voice channel. This results in all traffic being logged, even the traffic of the radios that transmit during the hang time.

If you do not select either PTT ID Enable or Transmission Trunking, operation is similar to that described above. However, reaffiliation does not occur during the hang time. Therefore, radios that key up during the hang time do not affiliate and are not logged. The radio system logs only the call of the radio that initiates the call.

Splinter Channels - When you check this, the receive and transmit frequencies are 12.5 kHz lower than the normal frequencies. Splinter channels are used only as required in the U. S.-Mexico and U. S.-Canada border areas for frequencies between 806 and 820.975 MHz.

Dynamic Regrouping - When you check this, you can program a dynamic regrouping channel. This is a SMARTNET/SmartZone channel that the dispatcher dynamically sets the talk group for. You select it on the channel screen. Refer to Section 6.3.3.

Transmission Trunking - The radio does not use hang time. The radio affiliates and receives a new channel grant on every PTT. When a radio unkeys, the radio system makes the channel available for other users immediately, and the system logs all traffic. If you do not check this, refer to the PTT ID Enable description above.

Connect Tone - The tone expected by the controller on the traffic channel to confirm the presence of a subscriber transmission. Set this tone the same as it is in the controller.

Private Call Usage

“Disabled” - The radio user cannot place private calls or receive them.

“Response Only” - The radio user can receive private calls but cannot place them.

“List Only” - The radio user can place private calls and receive them. The user can recall numbers from a programmed list only.

“Unlimited” - The radio user can place private calls and receive them. The user can recall numbers from a programmed list or dial them from the keypad. 53xx radios support this mode only when they use the HHC control unit. Standard 53xx front and remote models do not support number dialing.

Private Call 2

“Standard” - Selects the standard Private Conversation mode in which the user does not receive any feedback when the called radio is not active in the system. The radio user receives only a “No Answer” if the called radio does not answer.

“Enhanced” - Selects the Enhanced Private Conversation™ mode. When the radio users places a call with this mode, the system tells the user if the called radio is currently active in the system and within range. The calling radio displays “No Ack” if the called radio is not active in the system and “No Answer” if it is active but does not answer.

Phone Inter. Usage - Programs operation of telephone calls same as “Private Call Usage” above.

Affiliation Type (SMARTNET Only)

“Automatic” - The radio immediately affiliates with the central controller as soon as the radio operator turns it on. The radio automatically re-affiliates each time the talk group changes.

“On PTT” - The radio affiliates with the central controller each time the radio user presses the PTT switch, even when pressed during the hang time. Also, when the radio user keys the radio during the hang time, the radio holds the active channel during the re-affiliation. The re-affiliated radio continues traffic on this channel.

Channel Bandwidth - Selects the channel bandwidth as 25, 20, or 12.5 kHz.

“25 kHz” - Transmit Modulation Limiting is 4 kHz for NPSPAC (821 or 806) channels, 5 kHz otherwise.

“20 kHz” - Transmit Modulation Limiting is 4 kHz for all frequencies.

“12.5 kHz” - Transmit Modulation Limiting is 2.5 kHz for all frequencies.

Transmit Power - Fixes the radio’s transmit power at the high or low level, or makes it selectable for each system. If it is selectable, the radio must have a high/low power function switch.

RSSI Threshold (SmartZone Only) - Sets the Receive Signal Strength Indicator (RSSI) levels that determine when searching for and switching to another site occurs.

Tip *Do not change the RSSI Threshold default levels unless you know how these settings effect operation.*

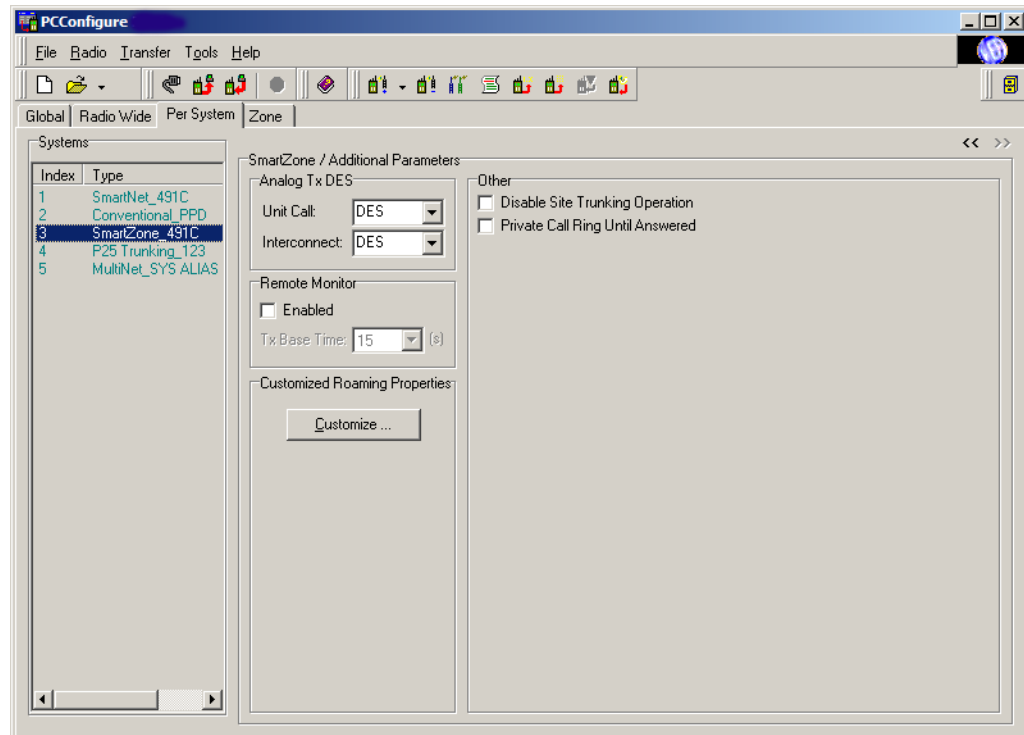
Hot DTMF - When you check this, the radio sends DTMF digits when the radio user presses buttons while transmitting in the SMARTNET/SmartZone analog mode.

STAR Trunking (SmartZone Only) - Selects this feature which is available with SmartZone systems. The system selected in the System: drop-down menu then becomes the “home” system. The radio system then requires no other system information to use this feature. You must enter the talk groups as with non-Omnalink systems. All other programming occurs on the infrastructure side. All required roaming information is received through adjacent site control channel data.

6.2.2 SMARTNET and SmartZone Additional Parameters

To open and close the second SMARTNET and SmartZone system programming screen, click the << >> buttons in the upper right corner of the screen. The following additional parameters are displayed. Figure 6.3 shows the parameters displayed on this second screen.

Figure 6.3 SMARTNET and SmartZone Additional Parameters



Analog Transmit DES - Allows you to specify the type of encryption individually for Unit and Interconnect calls made in the analog mode.

Remote Monitor

Enabled - Used to remotely key up the radio for emergency situations. System sends a trace talkgroup to the radio. The radio receives the command and performs a hotmic on that talkgroup for period of time programmed (15, 30, 45, 60 seconds).

Transmit Base Time - Time programmed for Remote Monitor. From 15 to 60 seconds in 15-second intervals.


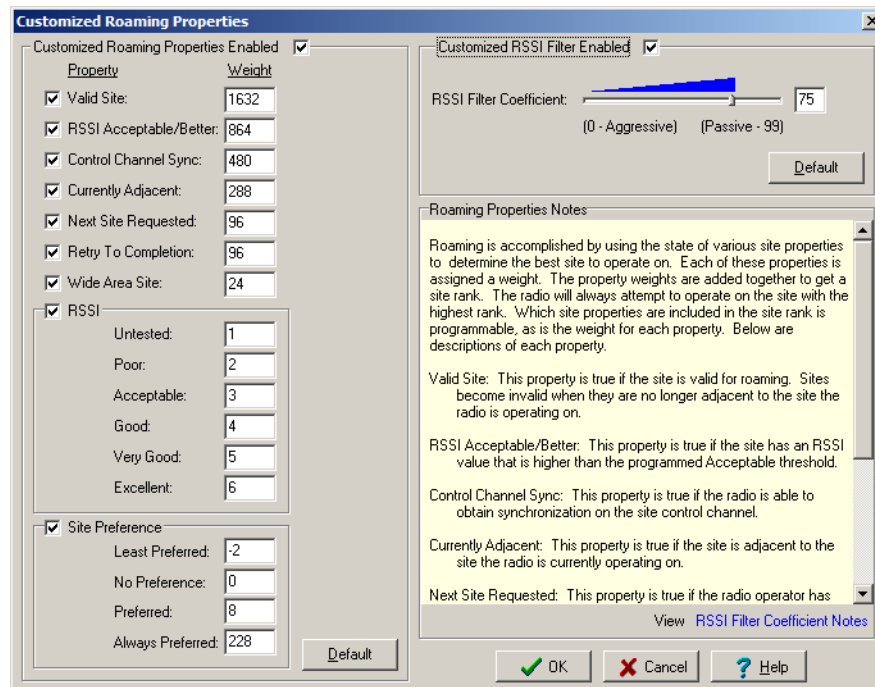
Customized Roaming Properties (SmartZone Only) - You can change SmartZone and Project 25 Trunked roaming properties by clicking the  button. The screen shown in Figure 6.4 is displayed. Information programmed in this screen is described in the Roaming Properties Notes window that is displayed. The RSSI Filter slider bar controls how quickly the radio reacts to dropouts in the RSSI level. The more aggressive the setting, the quicker site switching occurs.

Figure 6.4 SmartZone Customized Roaming Properties Screen



Customized Roaming Properties


Customized Roaming Properties Enabled ☒

Property	Weight
<input checked="" type="checkbox"/> Valid Site:	1632
<input checked="" type="checkbox"/> RSSI Acceptable/Better:	864
<input checked="" type="checkbox"/> Control Channel Sync:	480
<input checked="" type="checkbox"/> Currently Adjacent:	288
<input checked="" type="checkbox"/> Next Site Requested:	96
<input checked="" type="checkbox"/> Retry To Completion:	96
<input checked="" type="checkbox"/> Wide Area Site:	24
<input checked="" type="checkbox"/> RSSI	
Untested:	1
Poor:	2
Acceptable:	3
Good:	4
Very Good:	5
Excellent:	6
<input checked="" type="checkbox"/> Site Preference	
Least Preferred:	-2
No Preference:	0
Preferred:	8
Always Preferred:	228

Default

Customized RSSI Filter

Customized RSSI Filter Enabled ☒

RSSI Filter Coefficient:  75
(0 - Aggressive) (Passive - 99)

Default

Roaming Properties Notes

Roaming is accomplished by using the state of various site properties to determine the best site to operate on. Each of these properties is assigned a weight. The property weights are added together to get a site rank. The radio will always attempt to operate on the site with the highest rank. Which site properties are included in the site rank is programmable, as is the weight for each property. Below are descriptions of each property.

Valid Site: This property is true if the site is valid for roaming. Sites become invalid when they are no longer adjacent to the site the radio is operating on.

RSSI Acceptable/Better: This property is true if the site has an RSSI value that is higher than the programmed Acceptable threshold.

Control Channel Sync: This property is true if the radio is able to obtain synchronization on the site control channel.

Currently Adjacent: This property is true if the site is adjacent to the site the radio is currently operating on.

Next Site Requested: This property is true if the radio operator has

View [RSSI Filter Coefficient Notes](#)


OK Cancel Help

Other

Disable Site Trunking Operation - When you check this, you disable site trunking on the system.

Private Call Ring until Answered - For private calls, a ring is sounded until the user answers the call.

6.2.3 SMARTNET and SmartZone System Lists

Select the various SMARTNET and SmartZone lists by the **System Lists** drop-down menu on the SMARTNET and SmartZone **Per System** screen. After you select the desired list, edit it by clicking the  button.

This section contains descriptions of the following lists:

- Control channels list
- Status alias list
- Message alias list
- Call list
- Phone list
- Talk groups list
- Announcement groups list
- Priority scan list
- System alias / ID list (SmartZone systems only)
- System wide preferred site list (SmartZone systems only)
- Other band trunking list (VHF/UHF only)
- User group ID list
- Rebanded Control Channels (CC) list

Descriptions of the various lists and the information they program follow.

6.2.3.1 Control Channels List

The Control Channels List screen shown in Figure 6.5 allows the system manager to view and edit the control channels. Each SMARTNET system can have a maximum of four control channels. Each SmartZone system can have a maximum of 255 control channels.


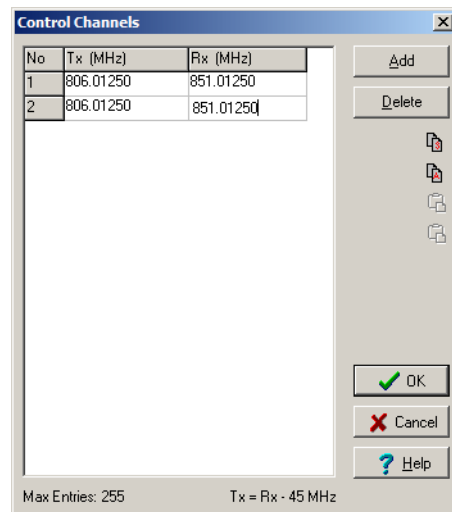
To display this screen, on the SMARTNET/SmartZone **Per System** screen, select “Control Channel List” in the drop-down menu, then click the  button.

Figure 6.5 Control Channels List Screen



To add a channel, click the **Add** button. To delete a channel, select it and click the **Delete** button. To edit a channel, select the digits that you want to change and edit them as desired. For the 800 MHz band, you can change only the receive channel frequency. PC Configure automatically calculates the transmit frequency (45 MHz below the receive frequency). These are the mobile frequencies, not the repeater frequencies. Only multiples of 5 kHz and 6.25 kHz are valid.

6.2.3.2 Status Alias List

The Status Alias List screen shown in Figure 6.6 is the interface where you program the alias for each of a maximum of eight status conditions. The system manager defines meaning of each status number.


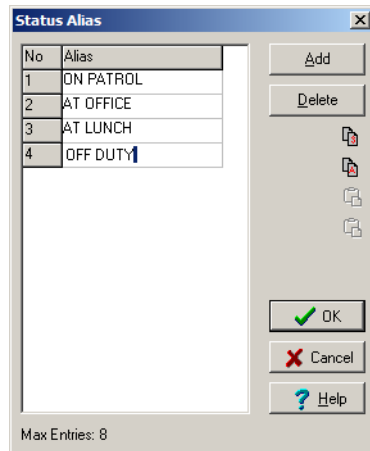
To display this screen, on the SMARTNET and SmartZone **Per System** screen, select “Status Alias List” in the drop-down menu, and click the  button.

Figure 6.6 Status Alias List Screen



To add an alias, click the **Add** button. To delete an alias, simply select it and click the **Delete** button. To edit an alias, select it and change it as desired. You can enter a maximum of ten characters. This identification displays when the user selects a status condition.

6.2.3.3 Message Alias List

The Message Alias List screen shown in Figure 6.7 associates an alias (name) with each message number. The system manager defines the meaning of each message number.


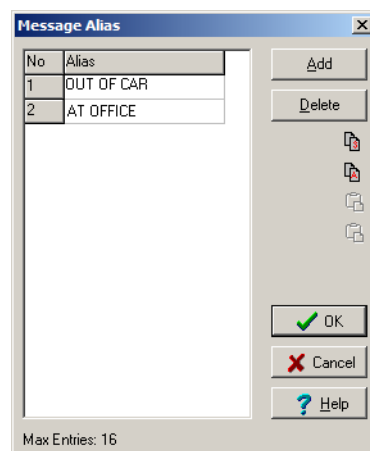
To display this screen, on the SMARTNET/SmartZone **Per System** screen, select “Message Alias List” in the drop-down menu, and click the  button.

Figure 6.7 Message Alias List Screen



To add an alias, click the **Add** button. To delete an alias, select it and click the **Delete** button. To edit an alias, select it and change it as desired. You can enter a maximum of ten characters. This identification displays when the user selects a status condition.

6.2.3.4 Call List


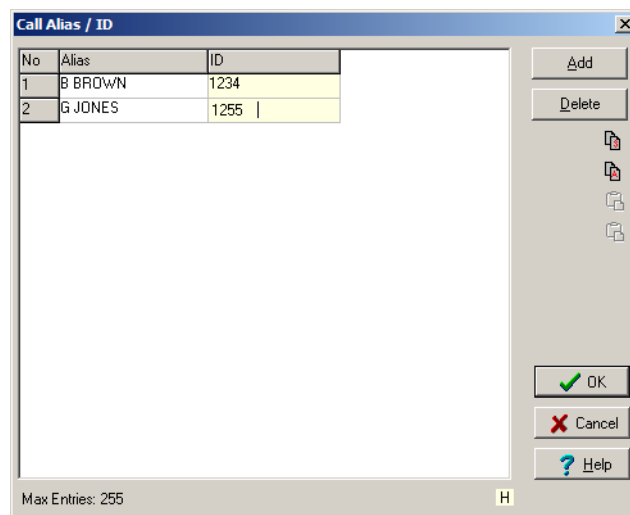
The Call List screen shown in Figure 6.8 programs the list of IDs used for private calls. You can program a maximum of 255 IDs. To display this screen, on the SMARTNET/SmartZone **Per System** screen, select “Call List” in the drop-down menu, then click the  button.

Figure 6.8 Call List Screen



To add a call, click the **Add** button. To delete a call, select it and click the **Delete** button. To edit an alias or ID, select it and enter the desired information as follows:

Alias - You can enter a maximum of ten characters to identify the user being called. This identification displays when the user selects the mobile radio to be called from the list. When the user receives a call from a unit in this list, the alias of the unit displays for the user instead of the calling unit's ID number. You can enter only capital letters, so PC Configure automatically converts any lowercase letters that you enter to capital letters.

ID - This is the ID of the radio that the user is calling. Valid entries are 0 through 65535. PC Configure detects zero ("0") as no entry.

6.2.3.5 Phone List


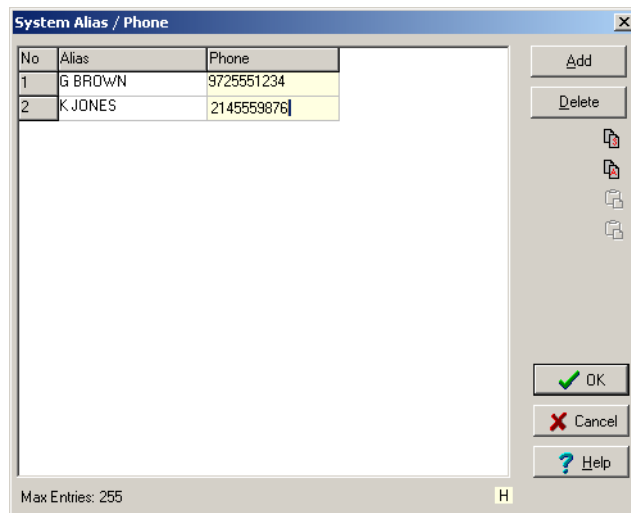
The Phone List screen shown in Figure 6.9 programs the telephone number list that the radio user may place telephone calls from (if you program the system to use this feature). You can program a maximum of 255 numbers. To display this screen, on the SMARTNET and SmartZone **Per System** screen, select “Phone List” in the drop-down menu, then click the  button.

Figure 6.9 Phone List Screen



To add a call, click the **Add** button. To delete a call, select it and click the **Delete** button. To edit an alias or number, select it and enter the desired information as follows

Alias - You can enter a maximum of ten characters to identify the number being called. This identification displays when the user selects the number to be called from the list. You can enter only capital letters, so PC Configure automatically converts any lowercase letters that you enter to capital letters.

ID - This is the telephone number that the radio dials when the radio user selects the location. Enter the three-digit area code and seven-digit telephone number using the numbers 0 through 9.

6.2.3.6 Talk Group List


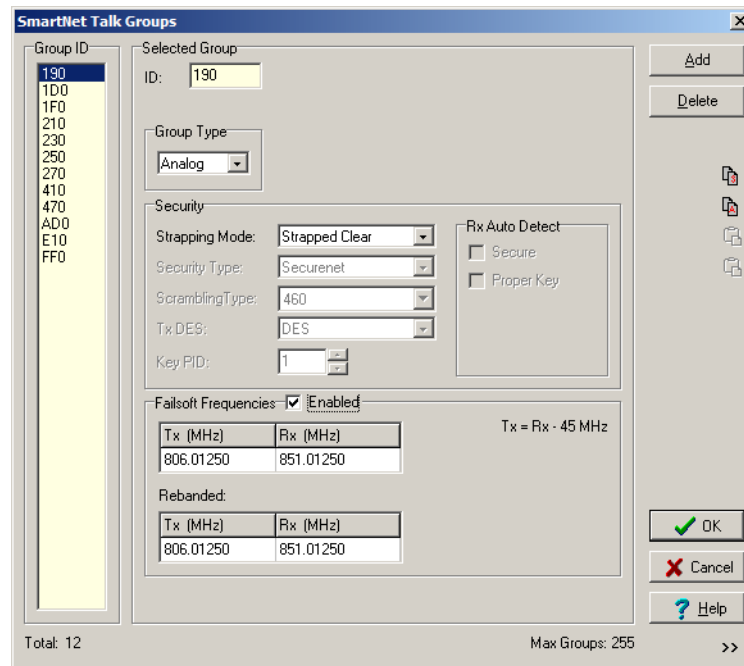
The SmartZone Talk Group List screen shown in Figures 6.10 and 6.11 sets up SMARTNET and SmartZone talk groups and programs unique talk group information. To display this screen, on the SMARTNET and SmartZone **Per System** screen, select “Talk Group List” in the drop-down menu, and click the  button.

Figure 6.10 SMARTNET Talk Group List Screen



The SmartNet Talk Groups dialog box is shown. It features a list of Group IDs on the left, with 190 selected. The main area displays configuration for the selected group, including Group Type (Analog), Security settings (Strapping Mode, Security Type, Scrambling Type, Tx DES, Key PID), Rx Auto Detect options, and Failsoft Frequencies (Tx and Rx MHz). The status bar at the bottom indicates 'Total: 12' and 'Max Groups: 255'.

Group ID	
190	
1D0	
1F0	
210	
230	
250	
270	
410	
470	
AD0	
E10	
FF0	

Selected Group ID: 190

Group Type: Analog

Security:

Strapping Mode: Strapped Clear

Security Type: Securenets

Scrambling Type: 460

Tx DES: DES

Key PID: 1

Rx Auto Detect:

☐ Secure

☐ Proper Key

Failsoft Frequencies: ☒ Enabled

Tx (MHz)	Rx (MHz)
806.01250	851.01250

Rebanded:

Tx (MHz)	Rx (MHz)
806.01250	851.01250

Tx = Rx + 45 MHz

Buttons: Add, Delete, OK, Cancel, Help

Status: Total: 12, Max Groups: 255

Figure 6.11 SmartZone Talk Groups Screen

The screenshot shows the 'SmartZone Talk Groups' configuration window. On the left, a 'Group ID' list contains the number '1'. The main area is titled 'Selected Group' and shows 'ID: 1'. Below this, the 'Group Type' is set to 'Analog'. There is a checkbox for 'Use Sys Preferred Site List' which is unchecked, and a 'List to Use' dropdown set to 'None'. The 'Security' section includes 'Strapping Mode' (Strapped Clear), 'Security Type' (Securenet), 'Scrambling Type' (460), 'Tx DES' (DES), and 'Key PID' (1). To the right of these are 'Rx Auto Detect' checkboxes for 'Secure' and 'Proper Key', both unchecked. The 'Failsoft Frequencies' section is checked 'Enabled' and shows two tables for Tx and Rx frequencies. The first table has Tx (MHz) 806.01250 and Rx (MHz) 851.01250, with a note 'Tx = Rx + 45 MHz'. The second table, labeled 'Rebanded:', has the same frequency values. The 'Talk Group Specific Preferred Sites' section has four checkboxes: 'Preferred Site 1' (checked), 'Preferred Site 2' (unchecked), 'Preferred Site 3' (unchecked), and 'Preferred Site 4' (unchecked). To the right, 'Selected Site' is '1', 'Site ID' is '1', and 'Preference' is 'None'. At the bottom left is a checkbox for 'Wide Area System Scan Preference' which is unchecked. On the right side of the window are buttons for 'Add', 'Delete', 'Site Lists', and icons for file operations. At the bottom right are 'OK', 'Cancel', and 'Help' buttons. The status bar at the bottom shows 'Total: 1' and 'Max Groups: 255'.

The parameters programmed in this screen are as follows:

ID - This list displays the talk group IDs contained in the Talk Group list. To edit a talk group ID in this list, select it and then change it in the **Selected Group** box. This is the actual ID of the talk group. You assign talk groups to channels in the **Zone** screen. Refer to Section 6.22.

Note *You can enter this ID in either the decimal or hexadecimal format as described in Section 1.9.4.*

Add - Click this button to add the next available talk group ID to the list. You can program each SMARTNET and SmartZone system with a maximum of 255 talk groups.


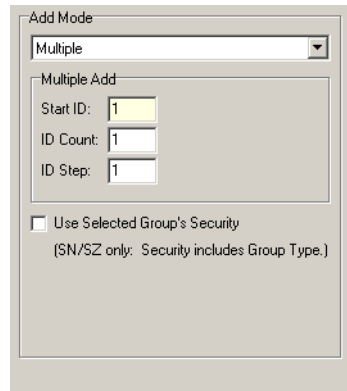
Add Mode - To add an entire block of talk group IDs or a specific ID, click the arrow button  in the lower right corner of the screen. The Talk Groups screen is expanded and the **Add Mode** panel, Figure 6.12, is displayed:

Figure 6.12 Add Mode Screen



Add Mode drop-down

Single - Adds the next available ID similar to the **Add** button.

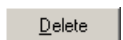
Multiple - Adds a block of IDs as follows: To initiate the selected add operation, click the **Add** button. If the specified ID range results in duplicate IDs, an error message displays and PC Configure adds no IDs.

Start ID - Specifies the starting ID of the block.

ID Count - Specifies the number of IDs to be added.

ID Step - Specifies if consecutive IDs are added or some other step rate is used. For example, if Start ID = 10, ID Count = 5, and ID Step = 10, the IDs added are 10, 20, 30, 40 and 50.

Use Selected Group's Security - When selected, PC Configure automatically programs the added groups with the Strapping Mode and Encryption Key ID of the selected group.

 - Clicking this button deletes the selected talk group.

Group Type - Select either “Analog” or “Digital” signaling on the talk group.

Use System Preferred Site List (SmartZone Only) - Selects one of the preferred site lists for the talk group. Refer to the “Preferred Sites” description which follows for more information.

Security

Strapping Mode

“Strapped Clear” - All transmissions on the talk group occur in the clear (unencrypted) mode.

“Strapped Secure” - All transmissions on the talk group occur in the secure (encrypted) mode selected as follows.

“Switched” - The clear or secure status of the talk group is selected by the Clear/Secure option switch.

Security Type - Select SecureNet. Scrambling is not supported.

Note *Voice encryption is an optional feature that requires factory programming and possibly special hardware.*

SecureNet - Selects the Motorola SecureNet DES type of secure communication when you select either the coded or switched strapping mode.

Tx DES

With analog channels, when you select “Securenet” secure communication, the DES type is selected.

On digital channels, you cannot select the type. Digital channels support both DES-OFB and AES encryption. The encryption key that the talk group selects determines the encryption type.

Key PID - Selects the location from 0-15 (PID/ASN mode) or 1-16 (SLN/CKR mode) of the key used for secure calls on the group if applicable.

Rx Auto Detect

Secure - If this option is checked, an encrypted signal is automatically detected and received. This option may increase the response time to incoming signals. If it is not checked, those signals are detected only if they are coded like the transmit signals.

Proper Key - If this option is checked, the radio will search the available encryption keys until it finds a match for the current transmission.

Failsoft Frequencies

Enabled - If you check this box, you enable a failsoft channel on the talk group if a controller or other major failure occurs. If you do not check this box, the radio does not enter failsoft mode if a failure occurs.

Tx (MHz) - Programs the failsoft transmit frequency if you checked Enabled.

Rx (MHz) - Programs the failsoft receive frequency if you checked Enabled.

Talk Group Specific Preferred Sites (SmartZone Only) - With SmartZone systems, you can associate a maximum of four preferred sites and/or a preferred site list with each talk group. Check the box of a preferred site to associate it with a talk group. This forces a call on the talk group to access the specified sites. The system manager can then keep mobiles on specific sites even if you do not enable the Site Search feature. You program the preference for each site as “Least”, “None”, “Preferred”, or “Always” as follows.

Program the preferred site lists at the System Preferred Site Lists screen described on Page 6-25. You can program a maximum of 16 lists. Each site can include up to 16 sites.

If both a preferred site list and one or more preferred sites (selected at bottom of screen) are associated with a talk group, the preferred sites at the bottom are searched first. The first entry found for a given site is used. If the same site is in both lists, the entry in the list at the bottom of the screen is used first.

Selected Site

Site ID - Designates a site that the talk group can roam to.

Preference - “Least”, “None” (no preference), “Preferred”, or “Always (preferred)” is a weighting for steering to different sites.

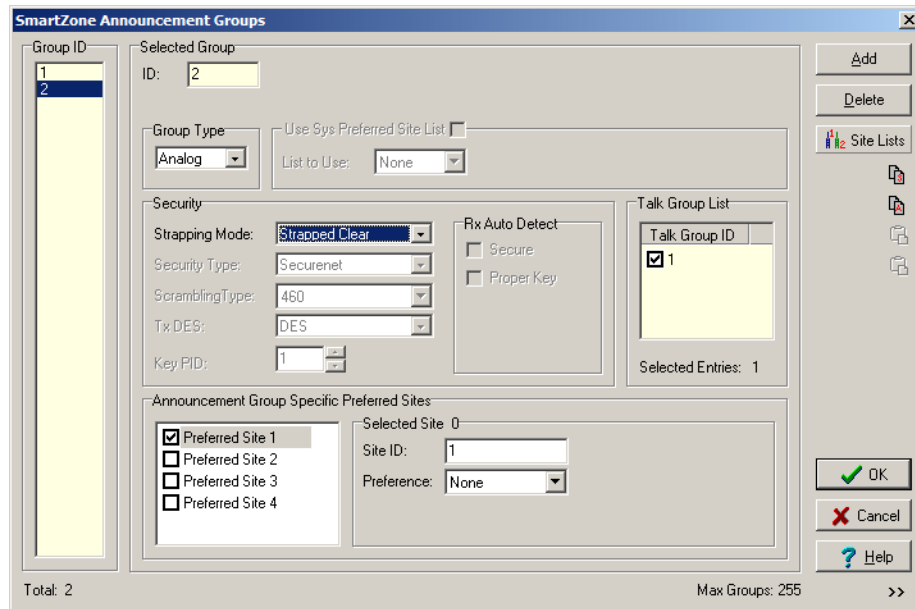
Wide Area System Scan Preference - The feature is exclusive to the talkgroup site preference settings. You can use talkgroup site preferences or you can use Wide Area System Scan. (You can also use the System Site Preference lists with Wide Area System Scan.) Once you enable the feature, PC Configure blocks the talkgroup site preference boxes on the form.

6.2.3.7 Announcement Group List


The Announcement Group List screen shown in Figure 6.14 sets up SMARTNET/SmartZone announcement groups that are used to communicate with several talk groups simultaneously. Each announcement group can have up to 15 talk groups.

Figure 6.13 SMARTNET Announcement Group List Screen

Figure 6.14 SmartZone Announcement Group List Screen

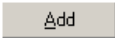


The dialog box is titled "SmartZone Announcement Groups". It features a "Group ID" list on the left with entries 1 and 2. The "Selected Group" section shows "ID: 2". Below this, the "Group Type" is set to "Analog". There are checkboxes for "Use Sys Preferred Site List" and "List to User" (set to "None"). The "Security" section includes "Strapping Mode" (Strapped Clear), "Security Type" (Securenet), "Scrambling Type" (460), "Tx DES" (DES), and "Key PID" (1). The "Rx Auto Detect" section has checkboxes for "Secure" and "Proper Key". The "Talk Group List" on the right shows "Talk Group ID" 1 selected. The "Announcement Group Specific Preferred Sites" section has checkboxes for "Preferred Site 1" through "Preferred Site 4", with "Preferred Site 1" checked. The "Selected Site" is 0, "Site ID" is 1, and "Preference" is "None". On the right side, there are buttons for "Add", "Delete", "Site Lists", "OK", "Cancel", and "Help". The status bar at the bottom indicates "Total: 2" and "Max Groups: 255".

To display this screen, on the SMARTNET or SmartZone **Per System** screen, select the “Announcement Group List” in the drop-down list and then click the  button. The parameters programmed in this screen are as follows:

Group ID - This list displays the Announcement group IDs currently contained in the Announcement Group list. To edit an ID in this list, select and change it in the Selected Group box. This is the actual ID of the announcement group. Announcement groups are assigned to channels in the **Zone** screen (see Figure 6.22).

Note *You can enter this ID in either decimal or hexadecimal format as described in Section 1.9.4.*

 - Click this button to add the next available announcement group ID to the list. You can program each SMARTNET/SmartZone system with up to 255 announcement groups.


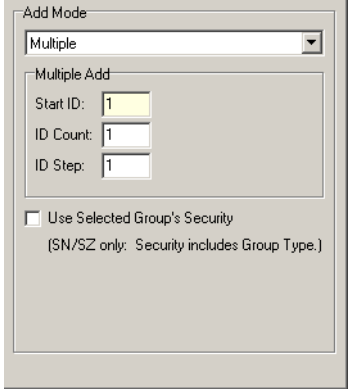

To add an entire block of announcement group IDs or a specific ID, click the arrow button  in the lower right corner of the screen. The Announcement Group List screen is expanded and the **Add Mode** panel is displayed. Refer to the preceding “Talk Group List” description for more information on this screen.

Figure 6.15 Add Mode Screen



The screenshot shows the 'Add Mode' dialog box. At the top is a dropdown menu set to 'Multiple'. Below it is a section titled 'Multiple Add' containing three input fields: 'Start ID:' with the value '1', 'ID Count:' with the value '1', and 'ID Step:' with the value '1'. At the bottom of the dialog is a checkbox labeled 'Use Selected Group's Security' with the text '(SN/SZ only: Security includes Group Type.)' below it.

 - Click this button to delete the announcement group that is currently selected in the list.

Group Type - Select either Analog or Digital signaling on the announcement group.

Use System Preferred Site List (SmartZone Only) - Select one of the preferred sites for the announcement group. Refer to the preceding Talk Group List description for more information.

Security

Strapping Mode

“Strapped Clear” - All transmissions on the talk group occur in the clear (unencrypted) mode.

“Strapped Secure” - All transmissions on the talk group occur in the secure (encrypted) mode selected as follows.

“Switched” - The clear or secure status of the talk group is selected by the Clear/Secure option switch.

Security Type - Select SecureNet. Scrambling is not supported.

Note *Voice encryption is an optional feature that requires factory programming and possibly special hardware.*

SecureNet - Selects the Motorola SecureNet DES type of secure communication when you select either the coded or switched strapping mode.

Tx DES

With analog channels, when you select “Securenet” secure communication, the DES type is selected.

On digital channels, you cannot select the type. Digital channels support both DES-OFB and AES encryption. The encryption key that the talk group selects determines the encryption type.

Key PID - Selects the location from 0-15 (PID/ASN mode) or 1-16 (SLN/CKR mode) of the key used for secure calls on the group if applicable.

Rx Auto Detect

Secure - If this option is checked, an encrypted signal is automatically detected and received. This option may increase the response time to incoming signals. If it is not checked, those signals are detected only if they are coded like the transmit signals.

Proper Key - If this option is checked, the radio will search the available encryption keys until it finds a match for the current transmission.

Talk Group List - Select the talk groups that are included in each announcement group. You can enter this ID in either decimal or hexadecimal format as described in Section 1.9.4.

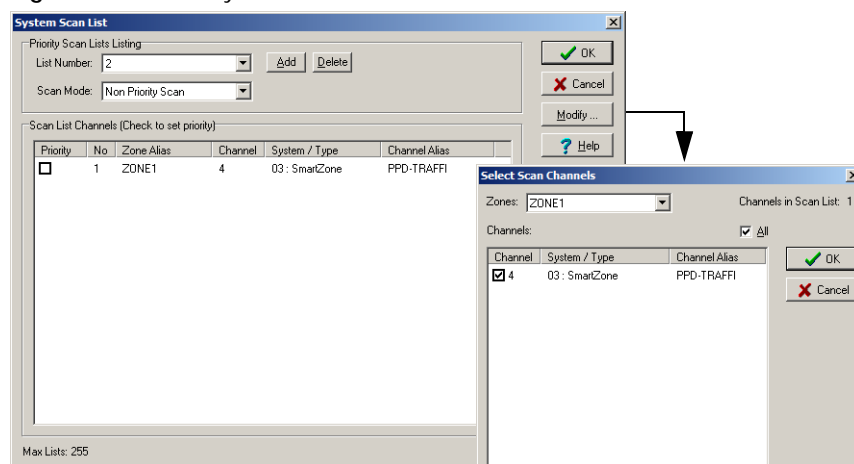
Announcement Group Specific Preferred Sites (SmartZone Only) - Program the preferred site information similar to talk groups described in the preceding “Talk Group List” description. You can associate up to four Preferred Sites and/or a Preferred Site List with each announcement group.


6.2.3.8 Priority Scan List

Note Before the priority monitor scan lists can be programmed as follows, you must set up the channels to be included in these lists in the **Zone** screen as described in Section 6.3.3.


The Priority Scan List screen shown in Figure 6.16 sets up the Priority (Standard) Scan lists that can be programmed on each SMARTNET or SmartZone system. Each scan list can include up to 16 channels, one of which may be a priority channel. These channels must be from the same SMARTNET or SmartZone system: Channels from other systems are not allowed.

Figure 6.16 Priority Scan List Screen



To display this screen, on the SMARTNET/SmartZone **Per System** screen, select “Priority Scan List” in the drop-down list and click the  button.

List Number - This drop-down list allows you to select the scan list to edit. Click the **Add** button to add a scan list and **Delete** to delete a scan list.

 - Click this button to display the screen shown on the right above which is used to edit the selected scan list. Check the channels in each zone to be included in the selected scan list. Repeat for the other scan lists if applicable.

Scan Mode - If priority scan is used on a list, select “Priority on Selected” (51xx/53xx only) or “Priority on Programmed” from the drop-down list. If priority scanning is not used, select “Non Priority Scan”. If “Priority on Programmed” is selected, check the priority box of the desired priority channel.

Note Priority talk group scanning must also be supported at the system level for it to occur as programmed. Talk Groups programmed as “Priority” in PC Configure must also be designated as Priority Monitor Groups by the System Control software.


6.2.3.9 Site List (SmartZone Systems Only)

Sites in a SmartZone system are designated by a number. The System Alias/ID screen shown in Figure 6.17 allows you to program an alias for each site number that is displayed when using the Site Search feature.

Figure 6.17 System Alias / ID Screen

No	Alias	ID
1	CENTRAL	01
2	NORTH	02
3	SOUTH	03
4	EAST	04
5	WEST	05

Max Entries: 64

To display this screen, from the SmartZone **Per System** screen, select “Site List” in the drop-down list and then click the  **Edit List ...** button. To add an alias, click the **Add** button. To delete an alias, select it and click the **Delete** button. To edit an alias or ID, select it and make the desired changes.

Alias - Programs up to ten alphanumeric characters that identify the site.

ID - Site ID from 0-48. A maximum of 255 entries are supported with the 5300 Rev 6 logic board.

6.2.3.10 System Preferred Site List (SmartZone Systems Only)

A maximum of 16 Preferred Site Lists can be programmed using the System Wide Preferred Site List screen shown in Figure 6.18. These lists can be associated with individual talk groups on the Talk Group List screen described in Section 6.2.3.6. This forces calls on a talk group to access specific sites. The preference for each site in a list can be set for Least, None, Preferred, or Always as follows.

Figure 6.18 System Wide Preferred Site List Screen

Each list can be programmed with up to 16 sites. Therefore, the use of Preferred Site Lists allows a maximum of 16 sites to be associated with a group instead of just four available on the Talk Group List screen. In addition, if several talk groups are associated with the same sites, a list can simply be selected instead of separate sites.

Site Lists - This drop-down list selects the list to be edited. To add a new list, click the **Add** button. To delete the selected list, click the **Delete** button.

Sites In List - To add/delete a site from the list, click the checkbox.

Site ID - Enter the site ID from 0-255. Thirty-two (32) lists are available.

Preference - Select the site preference in the drop-down list. A default weighting is usually assigned to these preference levels which results in the most preference given to “Always” and the least preference to “Least” as follows:

- 1 Always (preferred)
- 2 Preferred
- 3 None (no preference)
- 4 Least (preferred)

6.2.3.11 STAR List (Smart Zone Only)

The STAR List is used to create a list of control channels for each separate zone. This function is not used at this time.

6.2.3.12 Other Band Trunking List (VHF/UHF Only)

The Other Band Trunking screen shown in Figure 6.19 is displayed only when programming channels in the VHF and UHF frequency bands. It is used to define the relationship between transmit and receive channel frequencies in these bands. With 800 MHz systems, this is not required because the difference between transmit and receive frequency is always 45 MHz.

Figure 6.19 Other Band Trunking Screen

The screenshot shows the 'Other Band Trunking' dialog box with the following details:

- Split 1:**
 - Transmit: Spacing (KHz) = 25, Start Freq (MHz) = 136.0000, End Freq (MHz) = 145.4750
 - Receive: Spacing (KHz) = 25, Start Freq (MHz) = 136.0000, End Freq (MHz) = 145.4750
- Split 2:**
 - Enable: ☐
 - Transmit: Spacing (KHz) = [blank], Start Freq (MHz) = 000.0000, End Freq (MHz) = 000.0000
 - Receive: Spacing (KHz) = [blank], Start Freq (MHz) = 000.0000, End Freq (MHz) = 000.0000
- Split 3:**
 - Enable: ☐
 - Transmit: Spacing (KHz) = [blank], Start Freq (MHz) = 000.0000, End Freq (MHz) = 000.0000
 - Receive: Spacing (KHz) = [blank], Start Freq (MHz) = 000.0000, End Freq (MHz) = 000.0000

Buttons: OK (green checkmark), Cancel (red X), Help (question mark).

To display this screen, on the SMARTNET/SmartZone **Per System** screen, select the “Other Band Trunking” in the drop-down list and click the  **Edit List ...** button.

This screen organizes the available frequency band into three sub-bands, called splits. Each split is defined by a start frequency, stop frequency, and channel spacing as follows. Frequencies outside the defined split cannot be accessed by the radio. These frequency splits must be defined the same way they are defined for the trunking controller.

Tx and Rx Spacing - Spacing in kHz between each potential transmit and receive frequency.

Tx and Rx Start Frequency - Start in MHz of the band split for transmit and receive frequencies.

Tx and Rx Stop Frequency - Stop in MHz of the band split for transmit and receive frequencies.

6.2.3.13 User Group ID List

This User Group ID List screen shown in Figure 6.20 allows you to program aliases that can be displayed if a call is received on a talk group ID within the programmed block. For example, with the preceding screen, if a group call is received on group IDs 234-264, the alias “Fire” can be displayed. The display of this alias is controlled by the “User Group ID” parameter on the **Radio Wide** screen.

Figure 6.20 User Group ID List Screen

No	Alias	Start ID	Stop ID
1	FIRE	235	240
2	MAINT.	255	264
3	NEW ALIAS	1	1

Max Entries: 32

6.2.3.14 Rebanded CC List

This Control Channels List is the control channels for sites that have been rebanded.

Figure 6.21 Control Channels (Rebanded System List) Screen

No	Tx (MHz)	Rx (MHz)
1	806.01250	851.01250
2	806.01250	851.01250

Max Entries: 255 Tx = Rx - 45 MHz

6.3 Setting Up Zones and Channels

6.3.1 Setting Up Zones

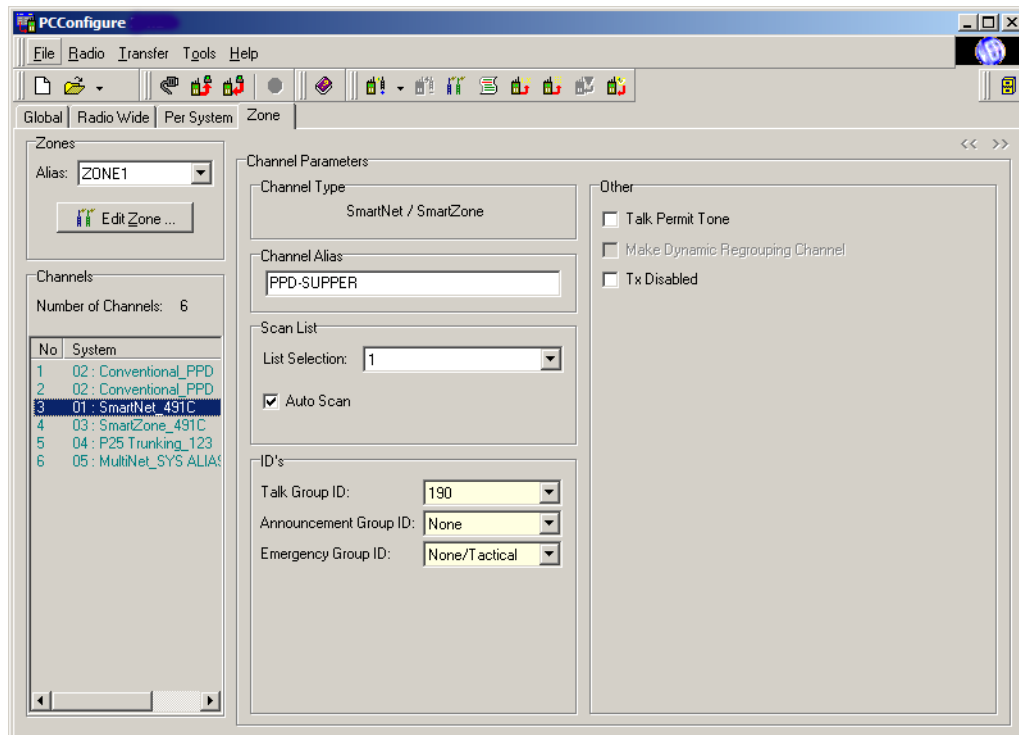
This section describes how to set-up zones and assign channels to each zone. A zone can include up to 16 channels of any type (conventional analog, Project 25 conventional, SMARTNET/SmartZone, Project 25 Trunked, or Multi-Net).

With the 51xx portable/53xx mobile, you can program a maximum of 32 zones for up to 512 channels if the “512 Talkgroups/Channels” option has been enabled. Refer to the **Transfer → Read Options** screen in your PC Configure application to see if this feature is available. Otherwise, a maximum of 16 zones (256 Talkgroups) can be programmed.

6.3.1.1 Setup Procedure

- 1 Select the **Zone** tab to display the Zone screen (See Figure 6.22.) This screen varies according to the type of system.

Figure 6.22 SMARTNET/SmartZone Zone Screen





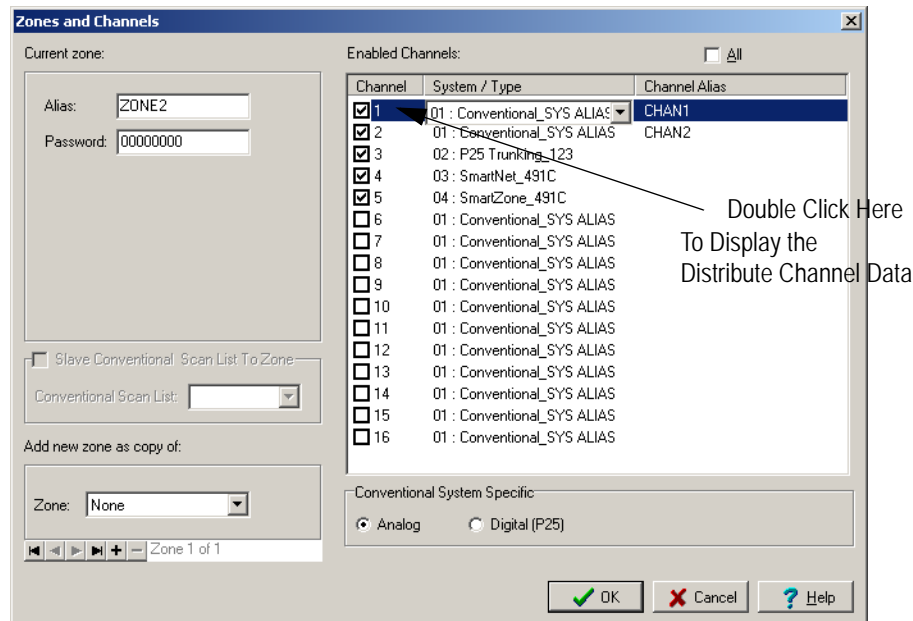






Click  in the upper left corner of the screen to display the **Zones and Channels** screen shown in Figure 6.23. Another way to do this is to click  in the toolbar.

Figure 6.23 Zones and Channels Screen



- 2 To add a new blank zone, select “None” in the Zone drop-down list and then click the  button. To make a copy of a current zone, select the desired zone in the Zone drop-down list instead. To delete the current zone, click the  button.
- 3 To display the first zone, click ; the last zone ; the previous zone ; and the next zone, .
- 4 Program the alias (identification) that is displays briefly when you select the zone. To do this, enter a maximum of ten characters in the **Alias** box.
- 5 You can program a zone password that you must enter to perform keypad programming of the zone. Refer to Section 11. To program this password, enter any eight numbers from 0-9. If you do not wish to program this password for the zone, simply leave this field all zeros.

6.3.2 Setting Up Channels

Note When you assign a channel to a zone, you also select the system of the channel. Therefore, before assigning a channel to a zone, set up all necessary systems as described in Section 1.10.

Set up channels by assigning them to a zone in the **Zones and Channels** screen shown in Figure 6.23.



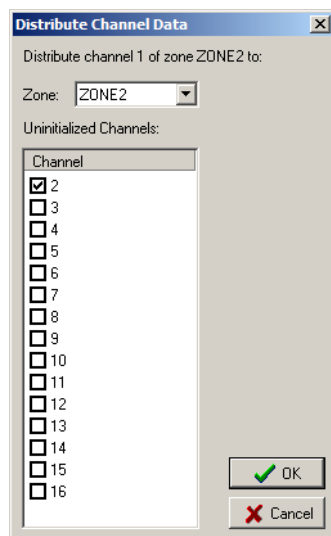
- 1 Select the **Zone** screen (see Figure 6.22) and then click  to display the **Zones and Channels** screen shown in Figure 6.23. Another way to do this is to click  in the toolbar.
- 2 Select the desired zone as described in the preceding section.
- 3 To add a channel to the displayed zone, check the applicable box in the **Channel** column. To select or deselect all channels in the box, check or uncheck the **All** box.
- 4 To assign the channel to a system (if applicable), select the drop-down list in the **System/Type** column and select the desired system.
- 5 To copy an enabled channel to unprogrammed channels of the current zone or other zones, double click the shaded area of the channel as shown in Figure 6.23. The **Distribute Channel Data** screen is displayed. Select the desired channels from this screen.

Figure 6.24 Distribute Channel Data

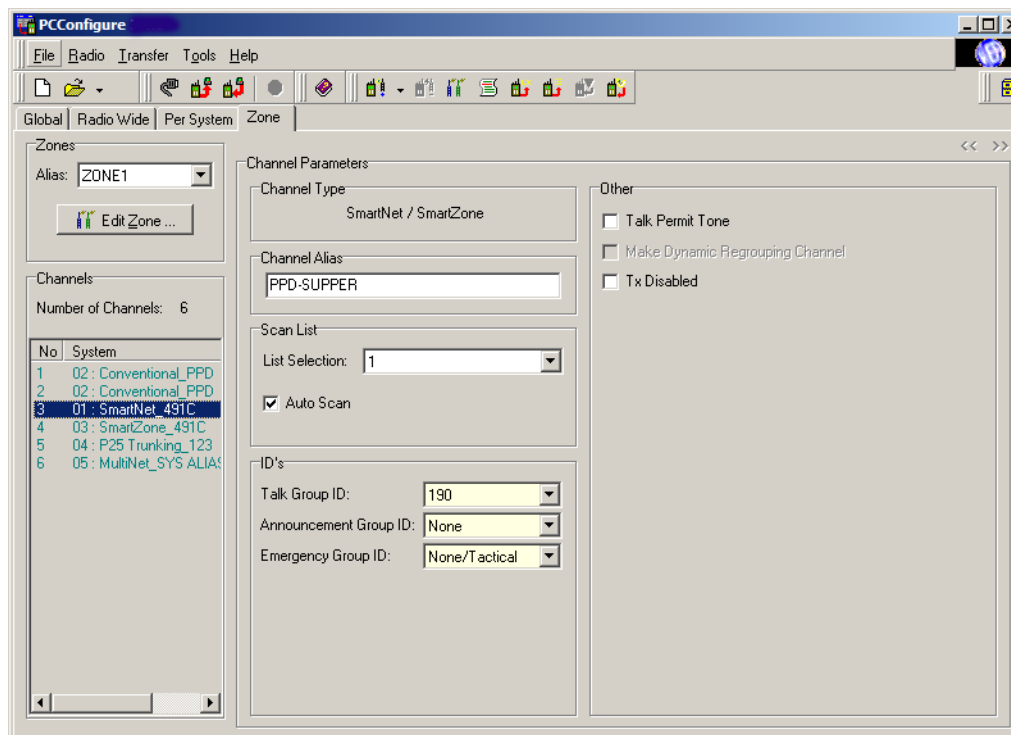


- 6 Repeat the preceding steps until the you have set up desired channels in each zone.
- 7 To program individual system and channel information, refer to Section 6.3.3.

6.3.3 SMARTNET/SmartZone Channel Parameters

After the desired channels have been set up as described in Section 6.3.2, you may program individual channel parameters. Select the **Zone** screen shown in Figure 6.25 and then select the desired Zone using the drop-down list in the **Alias** box. Select screens to program individual channel parameters by clicking the channel in the **Channels** box.

Figure 6.25 SMARTNET Zone Screen



The parameters displayed when a SMARTNET/SmartZone channel is selected are as follows.

Channel Parameters

Channel Type - Indicates the type of channel that is currently selected in the “Channels” box.

Channel Alias - Programs the alias (identification) that is displayed when the channel is selected. Up to ten characters can be programmed.

Scan List

List Selector - Selects the priority (standard) scan list selected by the channel. If “No List” is selected, scanning is not selectable on that channel.

Auto Scan - When this is checked, the radio automatically begins scanning the scan list associated with the channel whenever the channel is selected. When it is not checked, scanning must be started manually by the Scan option switch.

IDs

Operation with the various combinations of Talk Groups (TGs) and Announcement Groups (AGs) is as follows:

Talk Group Only - Transmit on TG, receive on TG.

Announcement Group ID - Transmit on AG, receive on all TGs in AG.

Talk and Announcement Groups - Transmit on TG and receive on TG plus AG but not the TGs assigned to the AG.

Tip *You can enter these IDs in either decimal or hexadecimal format as described in Section 1.9.4.*

Talk Group ID - Selects the talk group selected by that channel. Program Talk Groups by selecting “Talk Group List” on the **Per System** screen (see Section 6.2.3.6 or Section 7.2.3.6).

Announcement Group ID - Selects the receive-only announcement group selected by that channel. Program Announcement Groups by selecting “Announcement Group List” on the **Per System** screen (see Section 6.2.3.7 or Section 7.2.3.7).

Emergency Group ID - Selects the talk group used for emergency calls on the channel. If no Emergency Group is selected, the emergency is transmitted on the selected (tactical) talk group.

Other

Talk Permit Tone - When this feature is checked, a short tone sounds after a request for a group call has been approved by the main controller. This indicates that speaking can begin. When not checked, no audio feedback is used to indicate when speaking can begin.

Make Dynamic Regrouping Channel - Checking this box designates the channel as the dynamic regrouping channel. The talk group is then programmed over the air, so the Talk Group ID and Announcement Group ID are not programmable.

Dynamic Regrouping must be enabled on the System screen to program a dynamic regrouping channel. The dynamic talk group does not need to be a programmed group.

A **Cancel Dynamic Regrouping** option button or menu parameter (51xx only) can now be programmed (see Sections 2.4.2 and 2.4.3). This allows the user to reselect the previous talk group if desired.

Transmit Disabled - When this feature is checked, transmitting is disabled on the channel, and it can be used for monitoring only.

Project 25 Trunked Systems

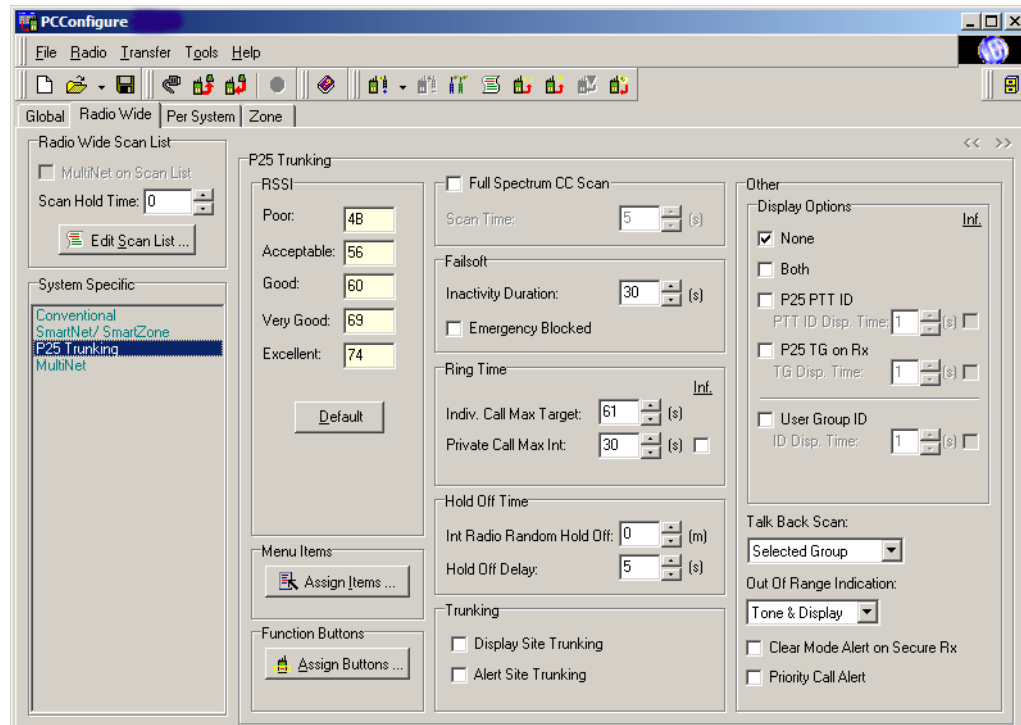
7.1 Radio Wide Screen

The **Radio Wide** screen programs parameters for all Conventional, Project 25 Trunked, SMARTNET/SmartZone, and Multi-Net systems. Areas of the screen common to all protocols are shown in Figure 2.1. A different screen displays for each system type. Figure 7.1 shows the Project 25 Trunked screen. This section contains the instructions to program these parameters for Project 25 Trunked Systems.

7.1.1 Radio Wide Parameters

Select “Project 25 Trunked” in the **System Specific** box to display the screen shown in Figure 7.1. This screen programs the functions that are the same for all Project 25 trunked systems.

Figure 7.1 Radio Wide Project 25 Trunking Screen



RSSI - This sets the Receive Signal Strength Indicator (RSSI) levels that determine when the radio tries to search for and switch to another site. Click the **Default** button to restore these levels to the default settings. If you check the **Hex** box, the RSSI levels display in as hexadecimal numbers instead of decimal numbers.

Note *Do not change the default RSSI levels unless you know how these levels affect radio operation.*

Full Spectrum CC Scan - Checking the box enables full spectrum scan. After the radio searches all potential control channel frequencies, it enters a channel-by-channel search across the full spectrum the radio covers. The timer sets the period of time the radio performs this scan before it checks the expected frequencies again. After it checks these frequencies, full spectrum scanning resumes. This cycle repeats until the radio finds a control channel.

Scan Time - Sets the time that full spectrum scanning occurs. You can select time periods between 5 and 31 seconds. The default is five seconds.

Failsoft - These parameters program failsoft operation that occurs when there is a controller or other major system failure.

Inactivity Duration - Sets the time the radio must remain inactive (no receive or transmit activity on channel) in the failsoft mode before it tries to leave the failsoft mode and attempt to find a control channel. If you program “0”, the radio does not leave the failsoft mode.

Emergency Blocked - If you check this, the radio user cannot make *emergency calls* when the radio is in the failsoft mode.

Ring Time

Individual Call Max Target - Sets the maximum ring time of the target radio when it receives phone and unit-to-unit calls. When this time expires, the call automatically discontinues. You can program time periods between 61 and 120 seconds. The default is 61 seconds.

Private Call Max Int - Sets the maximum time the initiating radio rings when it places a unit call. This does not include phone calls. Ringing stops if the target radio answers before this timer expires. You can program time periods between 1 and 255 seconds. The default is 30 seconds. If you program “infinite”, ringing continues until the target mobile answers.

Hold Off Time

Int Radio Random Hold Off - When a failure occurs on a site, this sets the delay that occurs before a radio leaves that site and registers on another. It also sets the delay that occurs before a radio returns to a site that has returned to normal operation. A random time is calculated between 0 and the selected time. This timer starts only when the following **Hold Off Delay** expires. You can program time periods between 0 and 60 minutes. The default is ten minutes.

Hold Off Delay - Sets the delay in registration or affiliation that occurs before starting the preceding random hold off time. During this delay, the radio monitors for over-the-air packets. You can program time periods between 5 and 60 seconds. The default is five seconds.

Trunking

Display Site Trunking - If you select this, “Site Trunking” displays if the affiliated site loses communication with the zone controller and begins to operate in the site trunking mode. This message displays until the zone controller returns to normal operation.

Alert Site Trunking - If you select this, an alert tone sounds when the radio enters the site trunking mode just described.

Other

Display Options - Select whether anything displays alternately with the selected channel alias or frequency when the radio receives Project 25 group calls.

None - Only the selected channel alias or frequency is displayed.

Both - Both of the following are displayed:

P25 PTT ID - The ID of the mobile placing the call displays. You can program this ID to display for 0.5-7.0 seconds or “infinite”. When you select “infinite”, this ID displays for the entire call and none of the other parameters display.

P25 TG on Rx - The radio displays the alias of the talk group on which the call is being received. You can program this to display for 0.5-7.0 seconds* or “infinite” as just described.

User Group ID - If the ID of the call being received is included in a User Group ID list as described in Section 5.2.2.7, the alias of that group displays. You can program this to display for 0.5-7.0 seconds or “infinite” as just described.

Talk Back Scan - When the radio receives a call while it is scanning, this setting determines the talk group of the radio’s response. You can program the radio to respond on the “Selected (talk) Group” or the received talk group (“Active Group”) if they are not the same. You program **Scan Hold Time** on the **Per System** screen.

Out Of Range Indication - Selects which of the following occur when an out-of-range condition exists:

- 1 The periodic tone sounds.
- 2 “Out of Rng” (or “NO SYS”) displays.
- 3 Both 1 and 2 above.
- 4 Neither 1 nor 2 above.

Clear Mode Alert on Secure Rx - When you select this, a beep sounds when the radio receives a Secure (encrypted) call in the Clear mode on a Project 25 trunked channel. If you do not select it, no beep sounds when this occurs.

Priority Call Alert - An audible tone tells the user he is receiving priority traffic and not just a standard scan channel. Although this feature is active for all systems, it is particularly applicable for the 5100 ES Model I radios.

7.2 Per Systems Screens

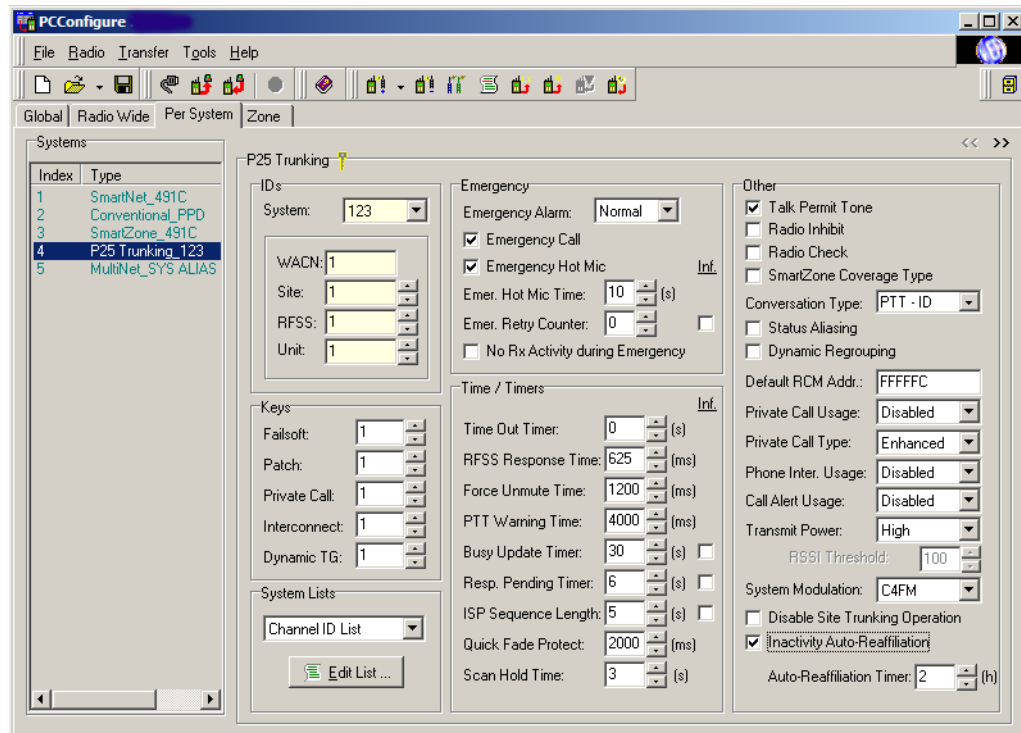
Two screens contain the interface where you program individual Project 25 trunked system parameters. This section contains descriptions of the parameters that you find on these screens. You can program these parameters after you set-up the desired systems as described in Section 1.10.

Note *Some Project 25 trunking parameters can be edited only if PC Configure detects the proper system key. PC Configure detects a key if a yellow key icon is indicated as shown in Figure 6.2. If there is a red “X” through this icon, PC Configure does not detect a key. Refer to Section 13 for more information.*

7.2.1 Project 25 Trunked System Parameters: Initial Screen

Figure 7.2 shows the initial Project 25 trunked system programming screen.

Figure 7.2 Initial Project 25 Trunked System Screen



Systems - Select the system for which you wish to set parameters.

IDs

Note You can enter these IDs in either decimal or hexadecimal format as described in Section 1.9.4.

System - This ID is determined and read from the system key. This ID comes from the system key in the *Keys* folder. (Refer to the related [Note](#) at beginning of this section.).

WACN - This ID, the home Wide Area Communications Network, is determined and read from the system key.

Site - Specifies the home site of the radio. If the Zone Fail Site Lock feature is enabled, this also determines the site the radio is restricted to if the zone controller goes down. (Zone Fail Site Lock is disabled by default in the subscriber units. It is enabled by setting the Zone Fail Site Lock option in PC Issue.)

RFSS - Specifies the default RF subsystem [RFSS (zone controller)], or the RFSS that the radio is restricted to if you enabled the SmartZone coverage option. One or more RF Subsystems make up a system. Valid IDs are 0 through 254.

Unit - Provides a unique identification of the radio on a system. Therefore, each radio must have a different Unit ID. Valid Unit IDs are 1 through 16,777,215 (000001 through FFFFFFFF hex). The decimal version of this ID is the private call ID of the radio.

Keys - Programs the following encryption key ID (hardware location) that the radio uses for all calls except group calls.

Failsoft - Key used in failsoft conditions.

Patch - Key used in patch calls.

Private Call - Key used for unit-to-unit (private) calls.

Interconnect - Key used for telephone calls.

Dynamic Talk Group - Key used for dynamic talk groups.

System Lists - Refer to Section 7.2.3 for more information.

Emergency

Emergency Alarm

“Disabled” - The radio sends no emergency signal when the user presses the Emergency option switch.

“Normal” - The radio sends an emergency alarm when the user presses the Emergency switch. If you disabled emergency calls, the alarm always occurs on the selected group. If you enabled emergency calls, it occurs—in order of preference—on the emergency group, selected group, and announcement group. When radio sends an emergency signal, the red transmit indicator lights, an emergency tone sounds, and “EMERGNCY” flashes in the display. “EMERGNCY” and the initiating ID continue to flash alternately until power is cycled, or the radio user presses and holds the Emergency switch.

“Silent” - Same as “Normal” except none of the preceding audio or visual indications occurs.

Emergency Call - When you check this box, if the radio user presses the Emergency option switch and then the PTT switch, an emergency group call transmits on the emergency group. The radio user cancels the emergency mode by cycling power or pressing and holding the emergency switch.

Emergency Hot Mic - When you check this box and the radio user sends an emergency alarm by pressing the Emergency switch, automatic transmitting occurs. The microphone audio is unmuted (without user intervention) for the time specified by the following Emergency Hot Mic Time. If you do not check this or if you do not select either emergency call, automatic transmissions do not occur. This feature initiates only by the first press of the Emergency switch. Subsequent presses do not trigger automatic transmissions. This function resets if the radio user changes the channel.

Emergency Hot Mic Time - Specifies the time period during which transmissions occur. You can select time periods of 10 through 120 seconds in ten-second increments.

Emergency Retry Counter - If you check **Inf** (infinite), the radio system repeats emergency calls until they are acknowledged or canceled. If you do not check it, the radio system repeats these calls only the specified number of times.

No Receive Activity during Emergency - When you check this box, the following radio receive indications do not display in the emergency mode: Receive audio, receive LED, and receive icons.

Time/Timers

Time Out Timer - This timer determines the maximum time period of a continuous transmission. You can program it for 15 through 225 seconds in 15-second intervals, or you can disable it (0).

RFSS Response Time - Specifies the time between attempts to affiliate on RFSS sites. You can program times of 625 through 7000 ms. The default is 625 ms.

Force Unmute Time - Specifies the maximum time the radio remains muted after transmitting because of probable system delay. If the radio determines that the incoming audio signal is from some other radio, the radio disregards this delay. You can program times of 25 to 6375 ms. The default is 1200 ms.

PTT Warning Time - Specifies the time the radio waits before sounding the PTT Prohibit tone. This tone warns the user that the PTT request is being processed and the user should release the PTT switch. You can program times of 25 through 6375 ms. The default is 4000 ms.

Busy Update Timer - Specifies the time the radio waits in a busy state for a reject, grant, or another busy update from the radio system. When this timer expires, the radio no longer expects a response from the system and the radio tries the transmission again. You can program times of 15 through 945 seconds. The default is 30 seconds.

Response Pending Timer - Specifies the time the radio waits when it expects a further response from the radio system to a request. This occurs when the system sends a response that indicates the request is being processed and a response is coming. When this timer expires, the radio no longer expects a response and the radio returns to the idle state. You can program times of 1 through 255 seconds or infinity. The default is six seconds.

ISP Sequence Length - Specifies the time the radio system allows each site for an ISP retry request. The radio retries until this timer expires. The radio makes at least five retries, regardless of this timer setting. You can program times of 1 through 255 seconds or infinity. The default is five seconds.

Quick Fade Protect - Specifies the time the radio will stay on the control channel when it loses synchronization before the radio tries to synchronize again. This allows recovery without completely synchronizing the channel again. You can program times of 200 through 6575 ms. The default is 2000 ms.

Scan Hold Time - Specifies the delay that occurs after the radio no longer receives a message before scanning resumes. You can program times of two through ten seconds. The default is three seconds.

Other

Talk Permit Tone - If you check this, a short tone sounds after the main controller approves a request for a group call. This indicates that speaking can begin. If you do not check this, the radio user hears no audio signal to indicate when speaking can begin.

Radio Inhibit - If you check this, the dispatcher can disable or enable the radio. When the radio receives this command, the radio sends an acknowledgment to the dispatcher. Then, the radio is disabled as follows.

- Receive audio is muted and transmit audio is disabled.
- All radio controls are inoperative.
- Scanning is disabled on the selected mode (Project 25 trunking).
- The transmit indicator is disabled and the display is blanked.

The dispatcher can then enable the radio again. As an alternative, you can enable the radio again by reading and then rewriting the programming data using PC Configure.

Radio Check - If you check this, the radio will respond to a remote check command. The dispatcher can send this command to confirm that the radio is active and operational on the system. If you do not check this, this command is ignored.

SmartZone Coverage Type - If you check this, roaming can occur only within the selected RFSS controller. If you do not check this, roaming can occur across all available RFSS controllers in the WACN system.

Conversation Type

“Message Trunking” - Not available with Project 25 trunking.

“PTT - ID” - Always select this mode with Project 25 trunking. The radio can key during the programmed hang time and continue the conversation on the active channel. If a user keys during the hang time, reaffiliation with the system occurs before using the voice channel. The radio holds the voice channel while this reaffiliation occurs. The call then connects to the open voice channel. This results in all traffic being logged, even from the radios which transmit during the hang time.

“Transmission” - The radio does not use hang time. The radio affiliates and receives a new channel grant on every PTT. When a radio unkeys, the radio system makes the channel available for other users immediately, and the system logs all traffic. If you do not check this, refer to the PTT ID Enable description above.

Status Aliasing - Enables and disables status aliasing for the system. This function allows you to customize status numbers and allows you to assign an alias name to each number.

Dynamic Regrouping - If you check this, you can program a dynamic regrouping channel. This is a Project 25 trunked channel that has the talk group dynamically set by the dispatcher. Select it on the zone screen. Refer to Section 7.3.3.

Default RCM Address - Specifies the Radio Control Manager used as the target address of Inbound Signaling Packet (ISP) transmissions such as status and message transmissions. You can program hexadecimal addresses from 000000 to FFFFFFFF. The default is FFFFFFFC.

Private Call Usage

“Disabled” - The radio user cannot place private calls or receive them.

“Response Only” - The radio user can receive private calls but cannot place them.

“List Only” - The radio user can place private calls and receive them. The user can recall numbers from a programmed list only.

“Unlimited” - The radio user can place private calls and receive them. The user can recall numbers from a programmed list or dial them from the keypad. 53xx radios support this mode only when they use the HHC control unit. Standard 53xx front and remote models do not support number dialing.

Private Call Type

“Standard” - Selects the standard Private Conversation mode in which the user does not receive any feedback when the called radio is not active in the system. The radio user receives only a “No Answer” if the called radio does not answer.

“Enhanced” - Selects the Enhanced Private Conversation™ mode. When the radio users places a call with this mode, the system tells the user if the called radio is currently active in the system and within range. The calling radio displays “No Ack” if the called radio is not active in the system and “No Answer” if it is active but does not answer.

Phone Interconnect Usage - Programs operation of telephone calls same as the preceding **Private Call Usage**.

Call Alert Usage - Programs operation of call alert calls (pages) the same as the preceding **Private Call Usage**.

Transmit Power - Fixes the radio’s transmit power at the high or low level, or makes it selectable for each system. If it is selectable, the radio must have a high/low power function switch.

RSSI Threshold (Project 25 Trunking Only/5300 Only) - Sets the Receive Signal Strength Indicator (RSSI) levels that determine when searching for and switching to another site occurs. This setting automatically sets the transmit power to “Low” once RSSI Thresholds are above this setting level.

System Modulation - Reserved for future use.

Disable Site Trunking Operation - The radio will go “Out of Range” if the site is in “Site Trunking”.

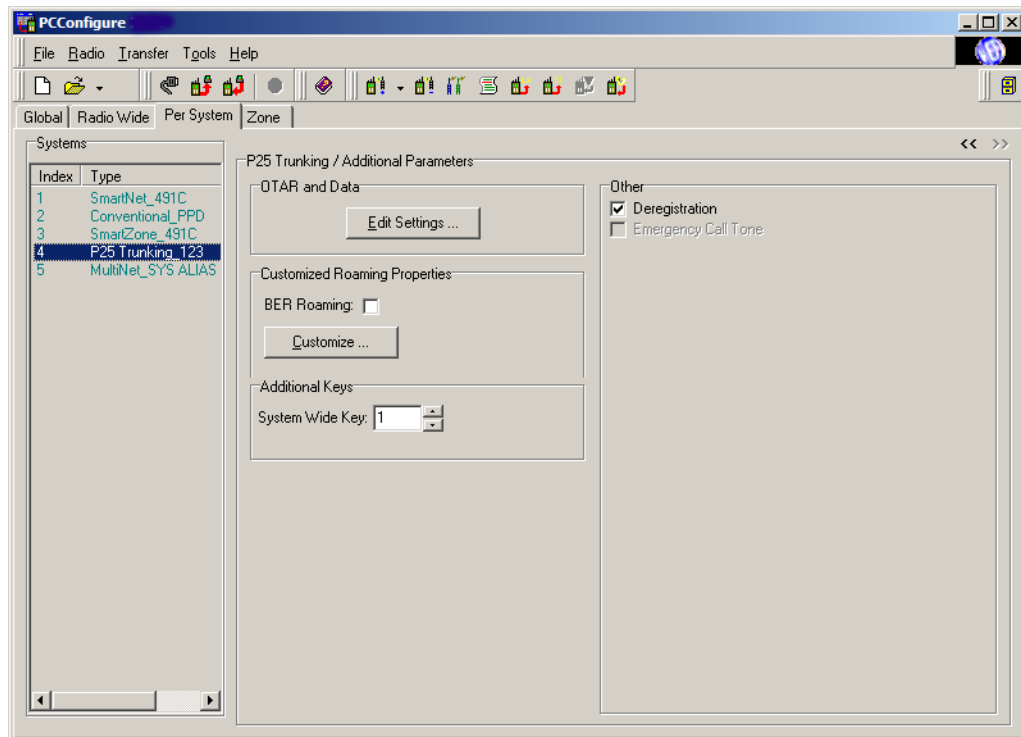
Inactivity Auto-Reaffiliation - If you check this, the radio attempts reaffiliation on the system if the radio has had no activity for the time period programmed by the **Auto-Reaffiliation Timer**.

Auto-Reaffiliation Timer - This parameter specifies the time the radio waits with no activity to attempt reaffiliation on the system.

7.2.2 Project 25 Trunked System Additional Parameters

You open and close a second Project 25 trunked system programming screen when you click the << >> buttons in the upper right corner of the screen. Figure 7.3 shows the parameters displayed on this second screen.

Figure 7.3 Second Project 25 Trunked System Screen



OTAR and Data Settings

Note To select OTAR and the data parameters that follow, you must select **SLN/CKR Mode** key management on the second **Global** screen. Refer to Section 4.2.

Click the **Edit Settings ...** button to display the OTAR and Data Settings screen shown in Figure 7.4. This screen is the interface where you program various OTAR and Project 25 data parameters.

Figure 7.4 OTAR and Data Settings Screen.

OTAR

OTAR Enabled - Select “On” to enable OTAR. Select “Off” to disable this feature.

Rekey Request Time Out - When the radio initiates rekeying (that is, when it sends an OTAR rekey request message), this setting determines how long the radio waits for a response from the Key Management Facility (KMF). You can program times of 20 through 180 seconds.

Rx Security Level

“Enhanced” - The radio accepts only encrypted and authenticated KMMs from the KMF (except for warm-start, which is authenticated only).

“Basic” - The radio accepts any KMM that is in a format allowed by the OTAR standard.

Tx Security Level

“Enhanced” - All OTAR procedures originating from the radio are encrypted and authenticated. If they cannot be encrypted and authenticated, the radio does not send the KMM.

“Basic” - The radio always sends unencrypted KMMs if the OTAR standard allows them to be unencrypted and unauthenticated.

Note *Fields that are grayed out are not applicable to P25 Trunking.*

Registration Inactivity Timer - If the radio has not registered any OTAR activity within the time period set by this timer (in hours), the radio attempts to re-register with the KMF.

Originating Response Kind - Selects if a response is required from the KMF to outgoing messages.

“Kind 1-Unconfirmed” - Requests no response.

“Kind 3-Confirmed” - Requests immediate response.

Registration Number of Attempts - Specifies the maximum number of times that the radio tries to complete a successful OTAR registration.

Registration Time between Attempts - Specifies the time in seconds that the radio waits after an unsuccessful OTAR registration attempt before it tries to register again. This time period should be greater than the **Data/SNDCP → Response Timer** below.

KMF IP Address - The KMF’s IP address.

KMF UDP Port - The UDP port that the radio uses when it sends Key Management Messages (KMMs) to the KMF. The default value is 64414.

Subscriber OTAR UDP Port - The UDP port that the radio uses for OTAR. The default value is 64414.

Data/SNDCP (Simple Network Data Control Protocol)

CAI Data Max Tx Attempts - Selects the maximum number of times the radio attempts to send a CAI data packet. Attempts to send the data packet continue until the radio receives an acknowledgment confirming the successful receipt of the packet, or until the radio exceeds the selected amount of transmit attempts.

Response Timer - Selects the period of time the radio waits for an acknowledgment that a CAI transmission is successful before it tries the transmission again.

SNDCP Activation Wait Timer - Controls the time that a radio waits for the KMF to respond to a SNDCP context activation request.

SNDCP Dwell Timer - Specifies amount of time data can stay in SNDCP output queue. Currently not implemented.

Rx Voice Interrupts Data - When checked, a voice call can interrupt data.

Subscriber IP Address - The IP Address assigned to the subscriber. Currently not used.

Mobile Computer IP Address - IP address for the mobile computer. Currently not used.

Tx Limited Patience - Selects the amount of time radio attempts to transmit a common air interface packet. Once time expires, radio ceases transmission. Times are 1 to 255 seconds, infinite in increments of 1. The default is infinite.

Min Response Timer - Selects the minimum amount of time that the radio waits for an acknowledgement of a successful CAI to be sent across the channel. Times are 50 to 2000 msec., in increments of 50 msec. The default is 700 msec.


Frame Sync Seek Period - Selects the amount of time the radio listens for a frame sync sequence before a packet is transmitted. Times are 0 to 5000 msec., in increments of 50 msec. The default is 750 msec.

Tx Short Random Range - Selects the maximum amount of time the radio waits to transmit once the first qualified FS is received indicating the channel is clear. Times are 50 to 500 msec., in increments of 50. The default is 50 msec.

Tx Long Random Range - Selects the upper range of the random range. When the radio detects a busy, the radio uses a random time within this range (Back off delay) to determine when to retransmit the packet. Times are 50 to 5000 msec., in increments of 50 msec. The default is 2000 msec.

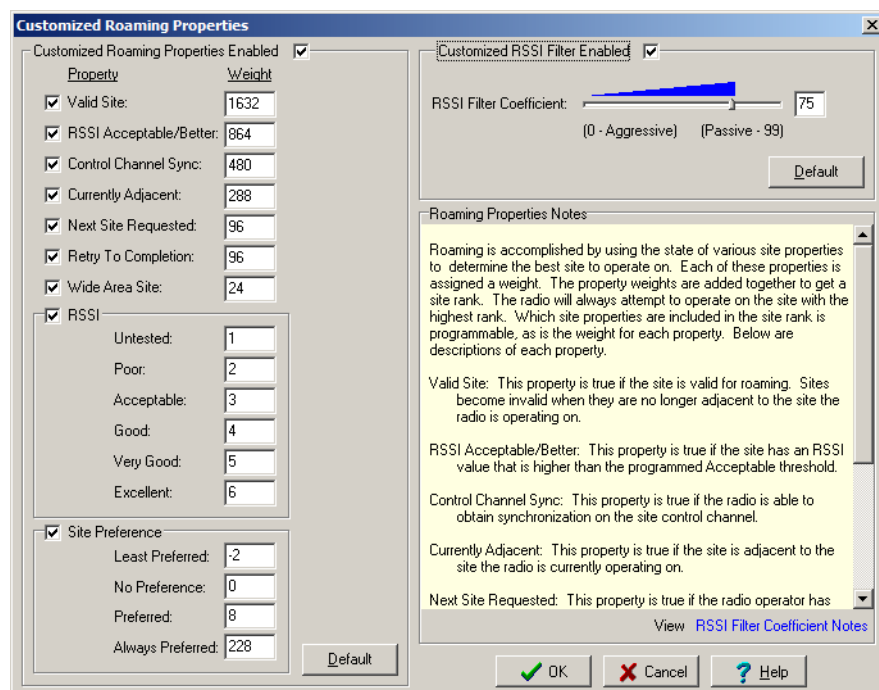
Tx Response Random Range - Selects amount of time radio waits before rechecking a channel's status once a busy channel status symbol has been received. Only applies to ACKs. Times are 50 to 1000 msec., in increments of 50. The default is 1000 msec.

Remaining fields on the second page of the Project 25 **Per System** screen include:

Customized Roaming Properties (P25 Only) - You can customize SmartZone and Project 25 Trunked roaming properties by clicking the  button. The screen shown in Figure 7.5 is displayed. Information programmed in this screen is described in the Roaming Properties Notes window. The RSSI Filter slider bar controls how quickly the radio reacts to dropouts in the RSSI level. The more aggressive the setting, the quicker site switching occurs.

BER Roaming - Uses control channel “Bit Error Rates” to determine which sites the radio should also roam.

Figure 7.5 Customized Roaming Properties Screen



Customized Roaming Properties

Customized Roaming Properties Enabled ☒

Property	Weight
<input checked="" type="checkbox"/> Valid Site:	1632
<input checked="" type="checkbox"/> RSSI Acceptable/Better:	864
<input checked="" type="checkbox"/> Control Channel Sync:	480
<input checked="" type="checkbox"/> Currently Adjacent:	288
<input checked="" type="checkbox"/> Next Site Requested:	96
<input checked="" type="checkbox"/> Retry To Completion:	96
<input checked="" type="checkbox"/> Wide Area Site:	24

☒ RSSI

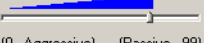
Untested:	1
Poor:	2
Acceptable:	3
Good:	4
Very Good:	5
Excellent:	6

☒ Site Preference

Least Preferred:	.2
No Preference:	0
Preferred:	8
Always Preferred:	228

Default

Customized RSSI Filter Enabled ☒

RSSI Filter Coefficient:  75

(0 - Aggressive) (Passive - 99)

Default

Roaming Properties Notes

Roaming is accomplished by using the state of various site properties to determine the best site to operate on. Each of these properties is assigned a weight. The property weights are added together to get a site rank. The radio will always attempt to operate on the site with the highest rank. Which site properties are included in the site rank is programmable, as is the weight for each property. Below are descriptions of each property.

Valid Site: This property is true if the site is valid for roaming. Sites become invalid when they are no longer adjacent to the site the radio is operating on.

RSSI Acceptable/Better: This property is true if the site has an RSSI value that is higher than the programmed Acceptable threshold.

Control Channel Sync: This property is true if the radio is able to obtain synchronization on the site control channel.

Currently Adjacent: This property is true if the site is adjacent to the site the radio is currently operating on.

Next Site Requested: This property is true if the radio operator has

View [RSSI Filter Coefficient Notes](#)

OK Cancel Help


Additional Keys

System Wide Key - Any system wide encrypted call would use this setting to select the encryption key location to use for the call.

Other

Deregistration - This selection forces the radio to de-register from the active system when powering down or when moving from one system to a different system (conventional or trunking).

7.2.3 Project 25 Trunked System Lists

Select the various Project 25 trunking lists by the “System Lists” drop-down menu on the Project 25 Trunking **Per System** screen. After you select the desired list, you can edit it by clicking the  Edit List ... button.

This section contains descriptions of the following lists:

- Channel identifiers list
- Control channels list
- Status alias list
- Call list
- Phone list
- P25 Trunking talk groups list
- P25 Trunking announcement groups list
- Priority scan list
- Site alias/ID list
- System wide preferred site list
- User group ID list
- Rebanded CC list

Descriptions of the various lists and the information they program follow.

7.2.3.1 Channel ID List

The Channel Identifiers List screen shown in Figure 7.6 displays only when programming channels in the VHF, UHF, and 700/800 MHz frequency bands (Other Band Trunking). Both Explicit and Implicit addressing is available.

Note *The system manager provides Channel ID and Control Channel information. This information must match the programming assigned to other subscriber units for it to function properly on the system.*

Figure 7.6 Channel Identifiers List Screen

No	Bandwidth (KHz)	Tx Offset Sign (+/-)	Tx Offset (MHz)	Spacing (KHz)	Base Frequency (MHz)
1	12.5	-	001.00000	006.25000	137.00000
2	12.5	-	0	0	0
3	12.5	-	0	0	0
4	12.5	-	0	0	0
5	12.5	-	0	0	0
6	12.5	-	0	0	0
7	12.5	-	0	0	0
8	12.5	-	0	0	0
9	12.5	-	0	0	0
10	12.5	-	0	0	0
11	12.5	-	0	0	0
12	12.5	-	0	0	0
13	12.5	-	0	0	0
14	12.5	-	0	0	0
15	12.5	-	0	0	0
16	12.5	-	0	0	0

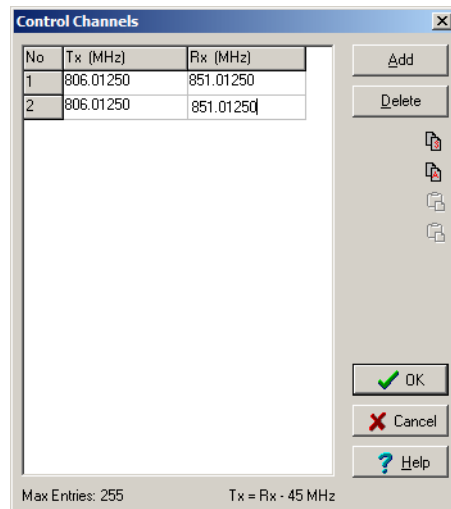
With Implicit Addressing, the control channel sends only the receive frequency. Information in this table determines the transmit frequency. With Explicit Addressing, the control channel sends both the receive and transmit frequencies. Both types reference information in this table. 800 MHz systems do not require this table because the difference between transmit and receive frequency is always 45 MHz.

7.2.3.2 Control Channels List

The Control Channels List screen shown in Figure 7.7 allows the system manager to view and edit the control channels. Each Project 25 trunking system can have a maximum of 255 control channels. Only one control channel is active at a time.

To display this screen, on the Project 25 Trunking System screen, select “Control Channel List” in the drop-down menu, then click the  button.

Figure 7.7 Control Channels List Screen

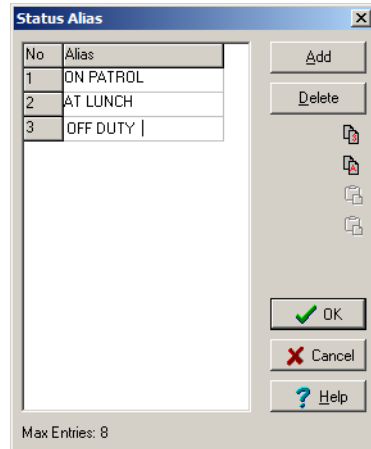


To add a channel, click the **Add** button. To delete a channel, select it and click the **Delete** button. To edit a channel, select the digits that you want to change and edit them as desired. For the 800 MHz band, you can change only the receive channel frequency. PC Configure automatically calculates the transmit frequency (45 MHz below the receive frequency). These are the mobile frequencies, not the repeater frequencies. Only multiples of 5 kHz and 6.25 kHz are valid.

7.2.3.3 Status Alias List

The Status Alias List screen shown in Figure 7.8 is the interface where you program the alias for each of a maximum of eight status conditions. The system manager defines meaning of each status number.

Figure 7.8 Status Alias List Screen



To display this screen, on the Project 25 Trunking **Per System** screen, select “Status Alias List” in the drop-down menu, then click the  **Edit List ...** button.

To add an alias, click the **Add** button. To delete an alias, select it and click the **Delete** button. To edit an alias, select it and change as desired. You can enter a maximum of ten characters. This identification displays when the user selects a status condition.

7.2.3.4 Call List


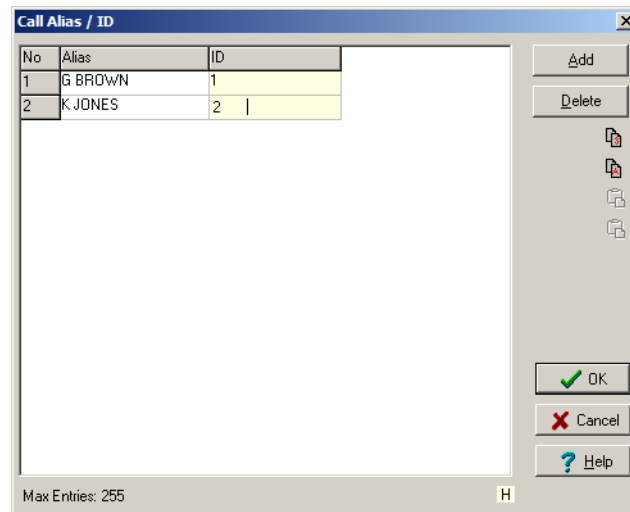
The Call Alias / ID List screen shown in Figure 7.9 is the interface where you program the list of IDs used for unit calls. You can program a maximum of 255 IDs. To display this screen, on the Project 25 Trunking **Per System** screen, select “Call List” in the drop-down menu, then click the  button.

Figure 7.9 Call Alias / ID List Screen



To add a call, click the **Add** button. To delete a call, select it and click the **Delete** button. To edit an Alias or ID, select it and enter the desired information as follows:

Alias - You can enter a maximum of ten characters to identify the user being called. This identification displays when the user selects the mobile radio to be called from the list. When the user receives a call from a unit in this list, the alias of the unit displays for the user instead of the calling unit's ID number. You can enter only capital letters, so PC Configure automatically converts any lowercase letters that you enter to capital letters.

ID - This is the ID of the radio that the user is calling. Valid entries are 1 through 16,777,215. PC Configure detects zero (“0”) as no entry.

7.2.3.5 Phone List


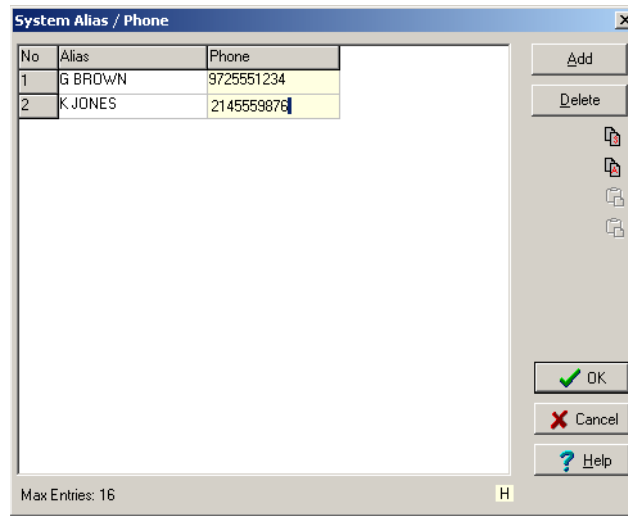
The Phone List screen shown in Figure 7.10 programs the telephone number list that the radio user may place telephone calls from (if you program the system to use this feature). You can program a maximum of 255 numbers. To display this screen, on the P25 Trunking screen, select “Phone List” in the drop-down menu, then click the  button.

Figure 7.10 Phone List Screen



To add a call, click the **Add** button. To delete a call, select it and click the **Delete** button. To edit an alias or number, select it and enter the desired information as follows:

Alias - You can enter a maximum of ten characters to identify the number being called. This identification displays when the user selects the number to be called from the list. You can enter only capital letters, so PC Configure automatically converts any lowercase letters entered to capital letters.

ID - This is the telephone number that the radio dials when the radio user selects the location. Enter the three-digit area code and seven-digit telephone number using the numbers 0 through 9.

7.2.3.6 Talk Group List


The P25 Trunking Talk Group List screen shown in Figure 7.11 sets up Project 25 Trunking talk groups. It is the interface at which you program unique talk group information. To display this screen, on the Project 25 Trunking **Per System** screen, select the “Talk Group List” drop-down menu, then click the  button.

Figure 7.11 P25 Trunking Talk Group Screen

The parameters programmed in this screen are as follows:

ID - This list displays the talk group IDs contained in the Talk Group list. To edit a talk group ID in this list, select it and then change it in the **Selected Group** box. This is the actual ID of the talk group. You assign talk groups to channels in the **Zone** screen. Refer to Figure 7.23.

Note You can enter this ID in either the decimal or hexadecimal format as described in Section 1.9.4.

Add - Click this button to add the next available talk group ID to the list. You can program each Project 25 trunking system with a maximum of 255 talk groups.


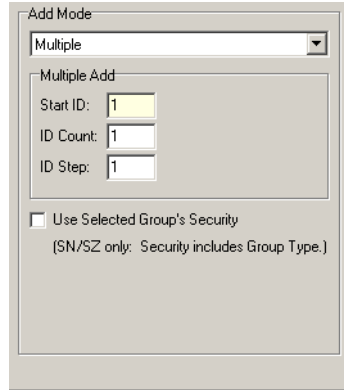
Add Mode - To add an entire block of talk group IDs or a specific ID, click the arrow button  in the lower right corner of the screen. The **P25 Trunking Talk Group** screen is expanded and the **Add Mode** panel, shown in Figure 7.12, is displayed:

Figure 7.12 Add Mode Panel



Add Mode Drop-down

Single - Adds the next available ID similar to the **Add** button.


Multiple - Adds a block of IDs as follows: To initiate the selected add operation, click the **Add** button. If the specified ID range results in duplicate IDs, an error message displays and PC Configure adds no IDs.

Start ID - Specifies the starting ID of the block.

ID Count - Specifies the number of IDs to be added.

ID Step - Specifies if consecutive IDs are added or some other step rate is used. For example, if Start ID = 10, ID Count = 5, and ID Step = 10, the IDs added are 10, 20, 30, 40 and 50.

Use Selected Group's Security - When selected, PC Configure automatically programs the added groups with the Strapping Mode and Encryption Key ID of the selected group.

 - Click this button to delete the selected talk group.

Security Parameters

Strapping Mode

“Clear” - All transmissions on the talk group occur in the clear (unencrypted) mode.

“Secure” - All transmissions on the talk group occur in the secure (encrypted) mode selected as follows.

“Selectable” - The radio user select the clear or secure status of the talk group is with the “Clear/Secure” option switch.

Encryption Key ID - Selects the location from 0 to 15 (PID/ASN mode) or 1 to 16 (SLN/CKR mode) of the key used for secure calls on the group if applicable.

Use System Preferred Site List - Selects one of the preferred sites for the talk group. Refer to the **Preferred Sites** description which follows for more information.

Failsoft Frequencies

Failsoft Enable - If you check this box, you enable a failsoft channel on the talk group if a controller or other major failure occurs. If you do not check this box, the radio does not enter the failsoft mode if a failure occurs.

Tx (MHz) - Programs the failsoft transmit frequency if you checked **Failsoft Enable**.

Rx (MHz) - Programs the failsoft receive frequency if you checked **Failsoft Enable**.

Talk Group Specific Preferred Sites

With Project 25 trunked systems, you can associate a maximum of four preferred sites. You can also associate a preferred site list with each talk group. This forces a call on the talk group to access the specified sites. The system manager can then keep mobiles on specific sites even if you do not enable the Site Search feature. You can program the preference for each site as “Least”, “None”, “Preferred”, or “Always” as follows.

You program the preferred site lists at the **System Wide Preferred Site List** screen described on Section 7.2.3.10. You can program a maximum of 16 lists. Each list can include a maximum of 16 sites.

If you associate a talk group with both a preferred site list and one or more preferred sites, the radio searches the preferred sites first. The first entry found for a given site is used. If the same site is in both lists, the entry in the list at the bottom of the screen is used first.

Selected Site

RFSS ID- Designates a zone controller that the talk group can roam to.

Site ID - Designates a site that the talk group can roam to.


Preference - “Least”, “None” (no preference), “Preferred”, or “Always (preferred)” is a weighting for steering to different sites.

Wide Area System Scan Preference - If the radio does not register on the system, it begins scanning to the last valid preference site on which it was registered.

7.2.3.7 Announcement Group List


The P25 Trunking Announcement Group List screen shown in Figure 7.13 sets up Project 25 Trunking announcement groups that communicate with several talk groups simultaneously. Each announcement group can have a maximum of 15 talk groups.

Figure 7.13 P25 Trunking Announcement Groups Screen

To display this screen, on the Project 25 Trunking **Per System** screen, select the “Announcement Group List” in the drop-down menu, then click the  button.

Group ID - This list displays the announcement group IDs contained in the announcement group list. To edit an ID in this list, select it and then change it in the Selected Group box. This is the actual ID of the announcement group. You assign announcement groups to channels in the **Zone** screen. Refer to Section 7.3.3.

Note *You can enter these IDs in either decimal or hexadecimal format as described in Section 1.9.4.*

 - Clicking this button adds the next available announcement group ID to the list. You can program each Project 25 Trunked system with a maximum of 255 announcement groups.


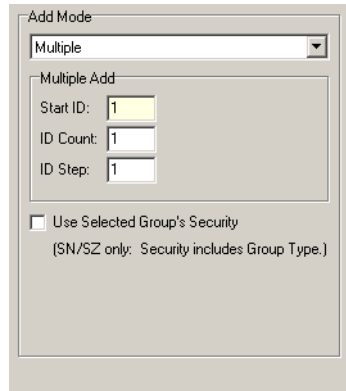
To add an entire block of announcement group IDs or a specific ID, click the arrow button  in the lower right corner of the screen. The **Add Mode** screen shown in Figure 7.14 then displays.

Figure 7.14 Add Mode Screen



Add Mode Drop-down list

Single - Adds the next available ID similar to the **Add** button.

Multiple - Adds a block of IDs as follows: To initiate the selected add operation, click the **Add** button. If the specified ID range results in duplicate IDs, an error message displays and PC Configure adds no IDs.

Start ID - Specifies the starting ID of the block.

ID Count - Specifies the number of IDs to be added.

ID Step - Specifies if consecutive IDs are added or some other step rate is used. For example, if Start ID = 10, ID Count = 5, and ID Step = 10, the IDs added are 10, 20, 30, 40 and 50.

Use Selected Group's Security - When selected, PC Configure automatically programs the added groups with the Strapping Mode and Encryption Key ID of the selected group.

 - Clicking this button deletes the selected announcement group.

Security Parameters

Strapping Mode

“Clear” - All transmissions on the talk group occur in the clear (unencrypted) mode.

“Secure” - All transmissions on the talk group occur in the secure (encrypted) mode selected as follows.

“Selectable” - The clear or secure status of the talk group is selected by the “Clear/Secure” option switch.

Encryption Key ID - Selects the location from 0 to 15 (PID/ASN mode) or 1 to 16 (SLN/CKR mode) of the key used for secure calls on the group if applicable.

Note *Voice encryption is an optional feature that requires factory programming and possibly special hardware.*

Note AES encryption is not available with the 51SL or 53SL.

Announcement Group Specific Preferred Sites - Select one of the preferred sites for the announcement group. Please refer to the P25 Trunking Talk Group List for more details.

Selected Site

RFSS ID- Designates a zone controller that the talk group can roam to.

Site ID - Designates a site that the talk group can roam to.

Preference - “Least”, “None” (no preference), “Preferred”, or “Always (preferred)” is a weighting for steering to different sites.

Talk Group List - Select the talk groups that are included in each announcement group. You can enter this ID in either decimal or hexadecimal format as described in Section 1.9.4.

7.2.3.8 Site List

Sites in a Project 25 Trunking system are designated by a site number and an RF subsystem (RFSS) number. The Site Alias / ID List screen shown in Figure 7.15 is the interface where an alias for each site that displays when using the Site Search feature is programmed.

Figure 7.15 Site Alias / ID Screen

No	Alias	Site ID	RFSS ID
1	CENTRAL	1	1
2	NORTH	2	2
3	SOUTH	3	3
4	EAST	4	4
5	WEST	5	5

Max Entries: 255

To display the preceding screen, on the Project 25 Trunking **Per System** screen, select “Site List” in the drop-down list and then click the **Edit List ...** button. To add an alias, click the **Add** button to display the **Add Alias/ID** screen. To delete an alias, select it and click the **Delete** button. To edit an alias or ID, simply select it and make the desired changes.

Alias - Programs up to ten alphanumeric characters that identify the site.

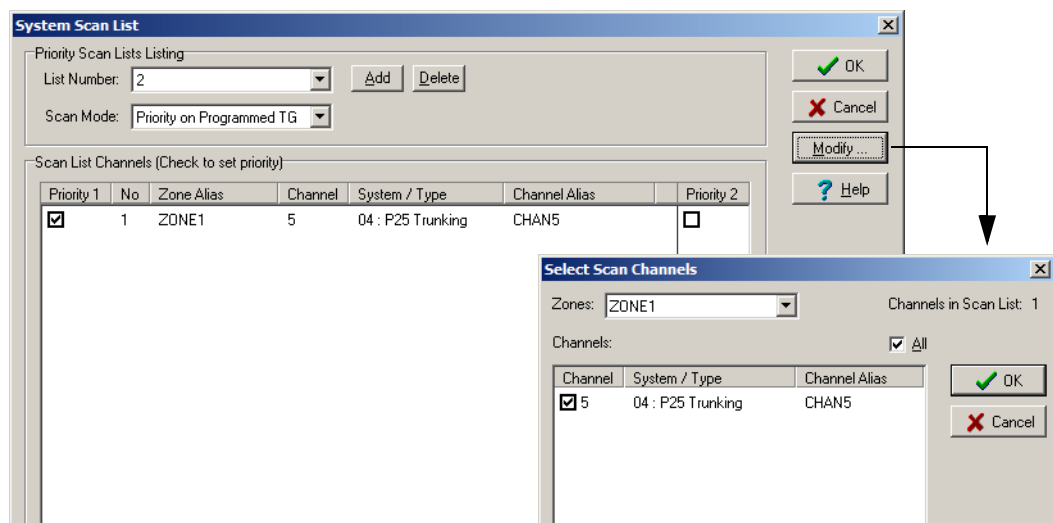
Site ID - Values can be from 0 through 48.


7.2.3.9 Priority Scan List

Note Before you can program the priority monitor scan lists, you must set up the channels that you want to include in these lists. You program them in the screen shown in Figure 7.23.

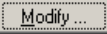
The Priority Scan List screen shown in Figure 7.16 sets up the Priority (Standard) Scan lists that you can program on each Project 25 Trunking system. Each scan list can include up to 16 channels, one of which may be a priority channel. These channels must be from the same Project 25 Trunking system. You cannot program channels from other systems. You can program as many lists as can be stored in the available memory.

Figure 7.16 Priority Scan List Screen



To display this screen, on the Project 25 Trunking **Per System** screen, select “Priority Scan List” in the drop-down menu and click the  button.

List Number - This drop-down menu is the interface where you select the scan list to edit. Click the **Add** button to add a scan list. Click the **Delete** button to delete a scan list.

 - Click this button to display the screen shown in Figure 7.16. This screen is the interface where you edit the selected scan list. Check the channels in each zone that you want to include in the selected scan list. Repeat for the other scan lists if applicable.

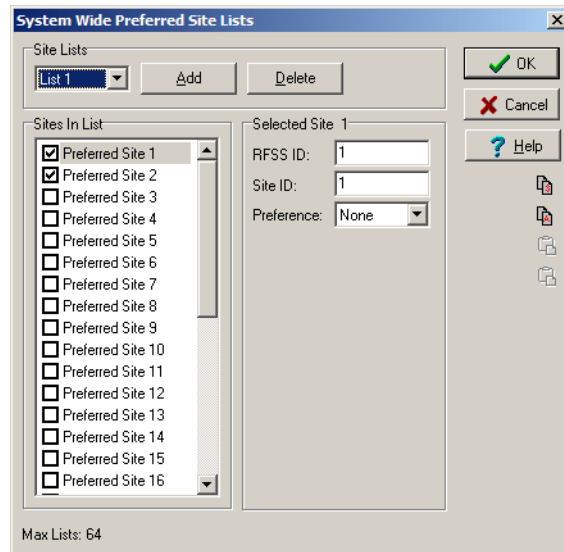
Scan Mode - To use priority scan on a list, select “Priority on Selected” (51xx/53xx only) or “Priority on Programmed” from the drop-down menu. If you select “Priority on Programmed”, check the box of the desired priority channel. If you do not want to use priority scan, select “Non Priority Scan”.

Note To use Priority talk group scanning, your system must support it for it to occur as programmed. You must designate talk groups programmed as “Priority” as Priority Monitor Groups by the System Control software.

7.2.3.10 System Preferred Site List

The System Wide Preferred Site List screen shown in Figure 7.17 is the interface where preferred site lists are programmed. You can associate these lists with individual talk groups on the **P25 Trunking Talk Groups** list screen shown in Figure 7.11. This forces calls on a talk group to access specific sites. You set the preference for each site in a list as “Least”, “None”, “Preferred”, or “Always” as follows:

Figure 7.17 System Wide Preferred Site List Screen



You can program each list with a maximum of 16 sites. Therefore, using preferred site lists allows you to associate a group with a maximum of 16 sites, rather than just four sites as available through the **P25 Trunking Talk Groups** list screen. Also, if you associate several talk groups with the same sites, you can simply select a list instead of separate sites.

Site Lists - This drop-down menu is the interface where you select the list that you want to edit. To add a new list, click the **Add** button. To delete the selected list, click the **Delete** button.

Sites In List - To add or delete a site from the list, click its check box.

Site ID - Enter the site ID from 0 through 48.

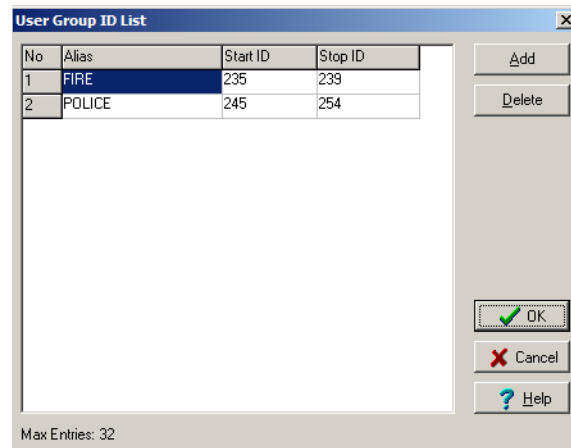
Preference - Select the site preference from the drop-down menu. A default weighting is usually assigned to these preference levels. This results in the most preference given to “Always” and the least preference to “Least” as follows:

- 1 Always (always preferred)
- 2 Preferred
- 3 None (no preference)
- 4 Least (least preferred)

7.2.3.11 User Group ID List

The User Group ID List screen shown in Figure 7.18 is the interface where you program aliases that display if a radio user receives a call on a talk group ID within the programmed block. For example, in the screen shown in Figure 7.18, if a radio user receives a group call from Group IDs 234 through 264, the alias “Fire” displays. The **User Group ID** parameter on the **Radio Wide** screen controls the display of this alias.

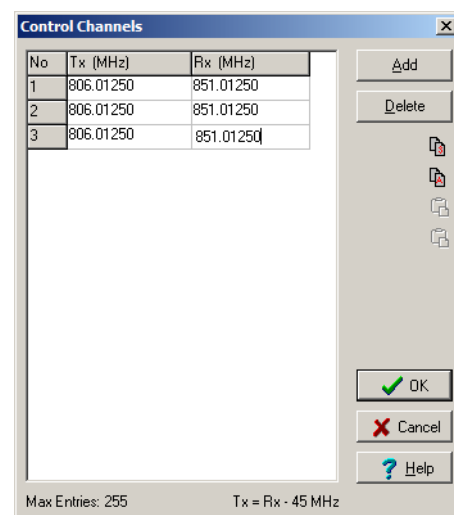
Figure 7.18 User Group ID List Screen



7.2.3.12 Rebanded CC List

The Control Channels List is the control channels for sites that have been rebanded.

Figure 7.19 Control Channels (Rebanded System List) Screen



7.3 Setting Up Zones and Channels

This section describes how to set-up zones and assign channels to each zone. A zone can include up to 16 channels of any type (conventional analog, Project 25 conventional, SMARTNET/SmartZone, Project 25 Trunked, or Multi-Net).

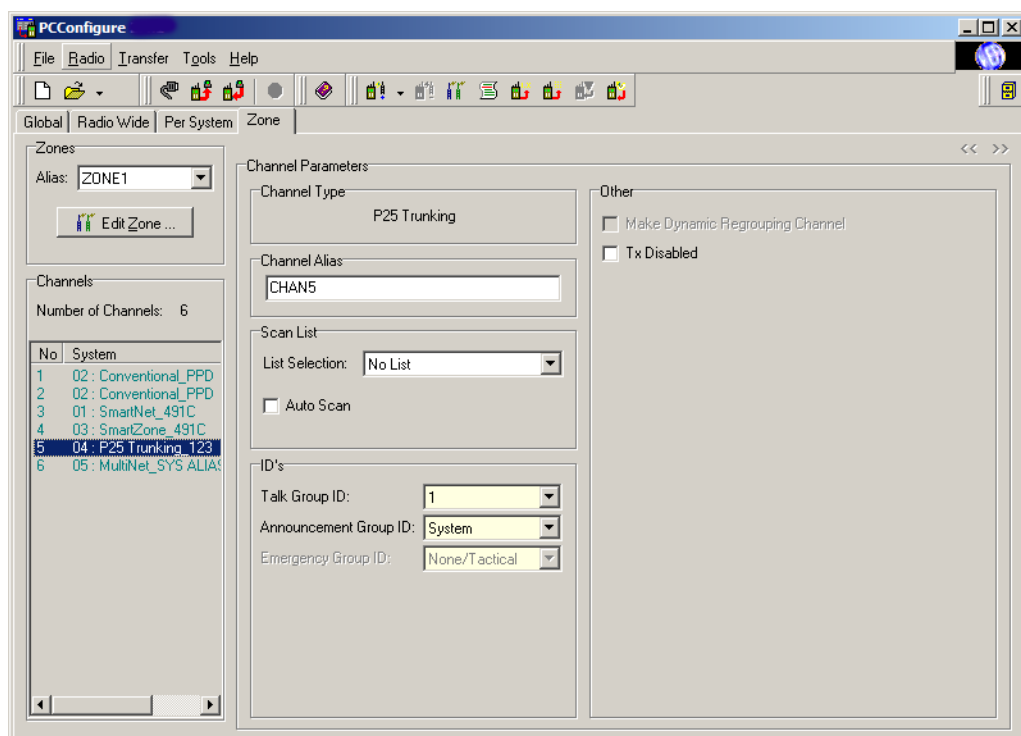
7.3.1 Setting Up Zones

With the 5100 portable/5300 mobile, you can program a maximum of 32 zones for up to 512 channels if the “512 Talkgroups/Channels” option has been enabled. Refer to Page 3-8. Otherwise, you can program a maximum of 16 zones (256 Talkgroups).

7.3.1.1 Setup Procedure

- 1 Select the **Zone** tab to display the Zone screen, Figure 7.20. (This screen varies according to the type of system.)

Figure 7.20 Project 25 Trunked Channel Zone Screen





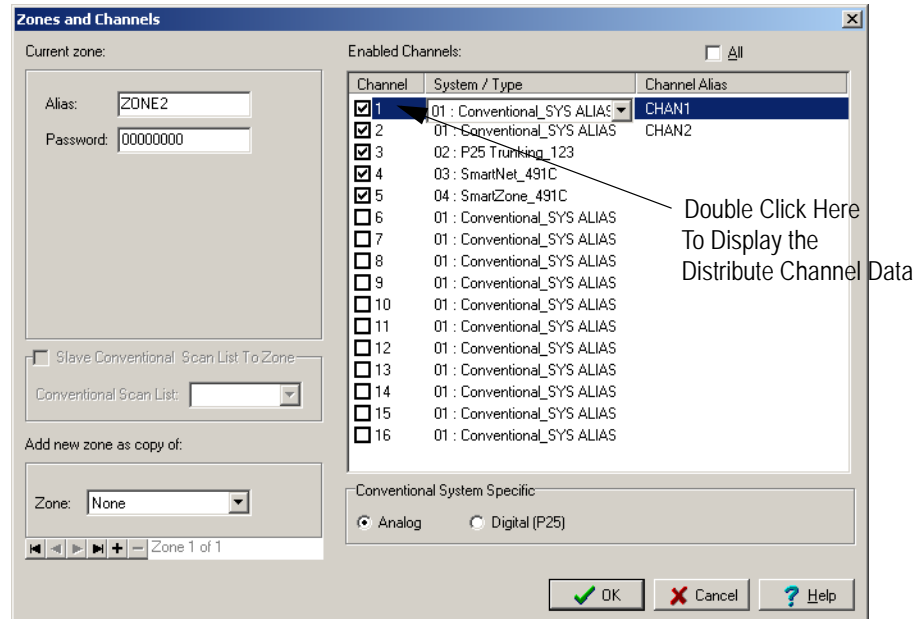






Click  in the upper left corner of the screen to display the **Zones and Channels** screen shown in Figure 7.21. Another way to do this is to click  in the toolbar.

Figure 7.21 Zones and Channels Screen



- 2 To add a new blank zone, select “None” in the Zone drop-down list and then click the  button. To make a copy of a current zone, select the desired zone in the Zone drop-down list instead. To delete the current zone, click the  button.
- 3 To display the first zone, click ; the last zone ; the previous zone ; and the next zone, .
- 4 Program the alias (identification) that is displays briefly when you select the zone. To do this, enter a maximum of ten characters in the **Alias** box.
- 5 You can program a zone password that you must enter to perform keypad programming of the zone. Refer to Section 11. To program this password, enter any eight numbers from 0-9. If you do not wish to program this password for the zone, simply leave this field all zeros.

7.3.2 Setting Up Channels

Note When you assign a channel to a zone, you also select the system of the channel. Therefore, before assigning a channel to a zone, set up all necessary systems as described in Section 1.10.

Set up channels by assigning them to a zone in the **Zones and Channels** screen shown in Figure 7.21. Proceed as follows to set up any type of channel.



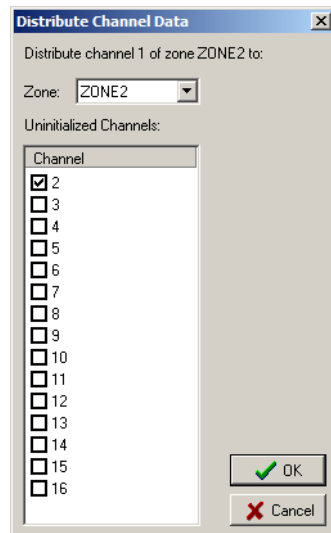
- 1 Select the **Zone** screen (see Figure 7.23) and then click  to display the **Zones and Channels** screen shown in Figure 7.21. Another way to do this is to click  in the toolbar.
- 2 Select the desired zone as described in the preceding section.
- 3 To add a channel to the displayed zone, check the applicable box in the **Channel** column. To select or deselect all channels in the box, check or uncheck the **All** box.
- 4 To assign the channel to a system (if applicable), select the drop-down list in the **System/Type** column and select the desired system.
- 5 To copy an enabled channel to unprogrammed channels of the current zone or other zones, double click the shaded area of the channel as shown in Figure 7.21. The **Distribute Channel Data** screen then appears. Select the desired channels from this screen.

Figure 7.22 Distribute Channel Data

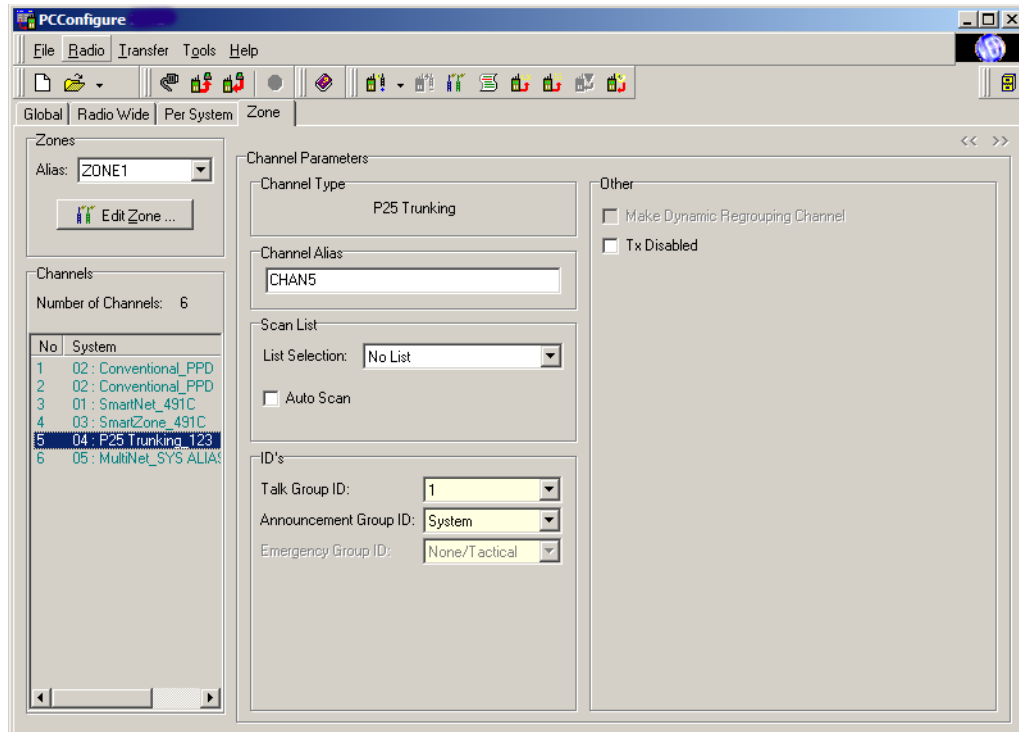


- 6 Repeat the preceding steps until the you have set up desired channels in each zone.
- 7 To program individual system and channel information, refer to Section 7.3.3.

7.3.3 Project 25 Trunked Channel Parameters

After you set-up your desired channels as described in Section 7.3.2, you can program individual channel parameters. Select the **Zone** screen shown in Figure 7.23, then select the desired zone using the drop-down menu in the **Zones** box. Select screens that program individual channel parameters by clicking the desired channels in the **Channels** box.

Figure 7.23 Project 25 Trunked Zone Screen



The parameters displayed when you select a Project 25 Trunking channel are as follows.

Channel Type - Indicates the type of channel (Conventional Analog, Conventional Digital, SMARTNET/SmartZone, Project 25 Trunked) that is currently selected in the **Channels** box.

Channel Alias - Programs the alias (identification) that displays when the radio user selects the channel. You can program a maximum of ten characters.

Scan List

List Selection - Selects the priority (standard) scan list selected by the channel. If you select “No List”, the radio user cannot select scanning on that channel.

Auto Scan - When you check this, the radio automatically begins scanning the scan list associated with the channel whenever the radio user selects the channel. When it you do not check this, the radio user must start scanning manually with the Scan option switch.

ID's - The possible combinations of Talk Groups (TGs) and Announcement Groups (AGs) provide the following operation:

- Talk Group Only - Transmit on TG, receive on TG.
- Announcement Group Only - Transmit on AG, receive on all TGs in AG.
- Talk and Announcement Groups - Transmit on TG and receive on TG plus AG but not the TGs assigned to the AG.

Note *You can enter these IDs in either the decimal or hexadecimal format as described in Section 1.9.4.*

Talk Group ID - Selects the talk group selected by that channel. Program talk groups selecting “Talk Group List” on the **Per System** screen. Refer to Section 7.2.3.6.

Announcement Group ID - Selects the announcement group selected by that channel. Program announcement groups by selecting “Announcement Group List” on the **Per System** screen. Refer to Section 7.2.3.7.

Emergency Group ID - Selects the talk group used for emergency calls on the channel. If you do not select an emergency group, the emergency signal transmits on the selected (tactical) talk group.

Other

Make Dynamic Regrouping Channel - When you check this box, you designate the channel as the dynamic regrouping channel. The system then programs the talk group over the air, so the talk group ID and announcement group ID are not programmable.

You must enable **Dynamic Regrouping** on the **Per System** screen to program a dynamic regrouping channel. The dynamic talk group does not need to be a programmed group.

Tx Disabled - When you check this box, you disable transmitting on the channel. You can then use the channel for monitoring only.

Multi-Net Systems

This section provides information to program Ascend portable and mobile radios for Multi-Net operation.

A Multi-Net[®] system, as used with the Ascend radios, programs the parameters for site quality and all the sites into which a radio will roam. Unique system parameters include such things as home repeater number, emergency zone/channel, group scan list, individual (unique) ID, and fixed priority, transmit inhibit, interconnect and unit call permissions, and block decode IDs. Up to sixteen systems can be created.

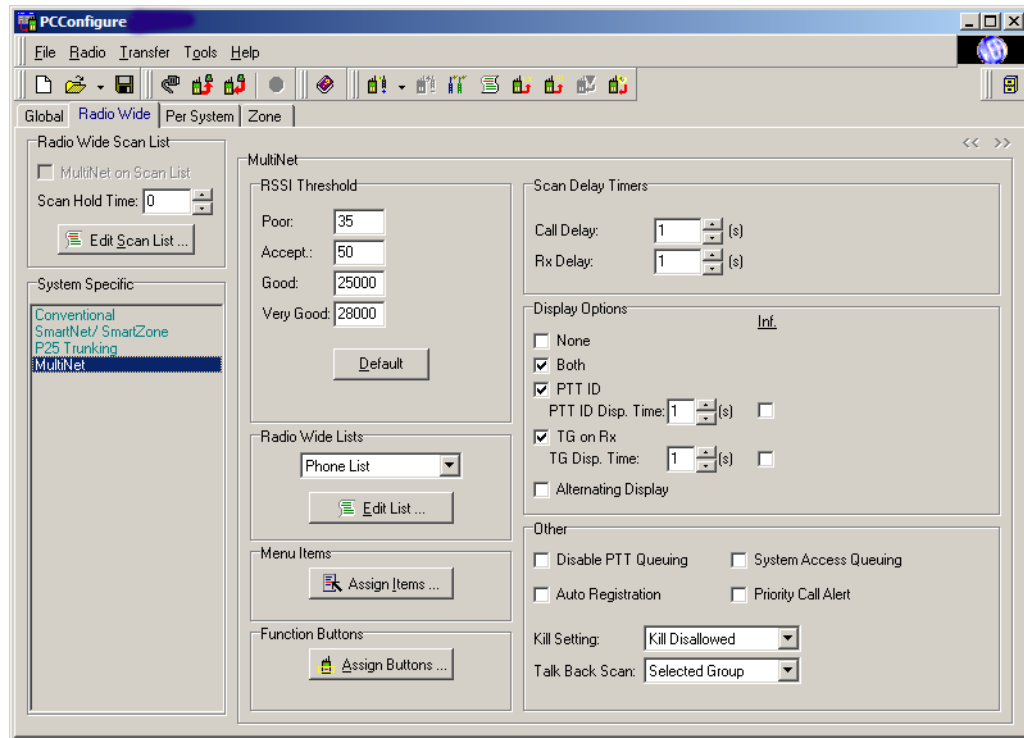
8.1 Radio Wide Screen

The **Radio Wide** screen programs parameters for all Conventional, Project 25 Trunked, SMARTNET[®]/SmartZone[®], and Multi-Net protocols. Areas of the screen common to all protocols are shown in Figure 2.1. A different screen displays for each system type. This section contains the instructions to program these parameters for the Multi-Net system.

8.1.1 Radio Wide Parameters

Select “Multi-Net” in the System Specific box to display the screen shown in Figure 8.1. This screen programs the functions that are the same for all Multi-Net systems.

Figure 8.1 Radio Wide Multi-Net Screen



RSSI Threshold - This sets the RSSI (Receive Signal Strength Indicator) levels. The RSSI of a site must exceed Acceptable for it to be considered as a candidate for a new site by the site search procedure. A site falling below acceptable may start site search. Click the **Defaults** button to restore these levels to the default setting.

Ascend radios with software 4.6.x may use Poor, Acceptable and Good RSSI levels to determine an acceptable site. The Multi-Net Per System Site Lookback Time option and Site Select Option refer to these RSSI levels to determine site quality and when to begin site search.

If the “Hex” box is checked, the RSSI levels are displayed in the hexadecimal instead of decimal notation.

Note *The default RSSI levels should not be changed unless you are familiar with how these levels affect radio operation. Increasing the value of Acceptable requires a stronger signal to meet site criteria and decreases the effective coverage area.*

Radio Wide Lists - Refer to Section 8.1.2 for more information.

Scan Delay Timers - These timers program various setting for Multi-Net group scanning. Radio wide scan settings are programmed on the Radio Wide screen.

Call Delay - Programs the delay before scanning resumes after responding to a message.

Receive Delay - Programs the delay before scanning resume after receiving a message.

Display Options - These functions select what is displayed when a group call is received. It does not affect the information displayed when a special call is received.

None - Only the talk group alias of the call or the selected talk group alias is displayed, depending on the call type.

Both - PTT ID and Talk Group on Receive are displayed.

PTT ID - The individual (unique) ID of the mobile placing the call is displayed. The time this ID is displayed is programmable for 0.5-7.0 seconds. When “infinite” is selected, this ID is displayed for the entire call and none of the other parameters are displayed. After time out, the channel (group) alias is then displayed continuously.

Talk Group on Receive - The group ID on which the call is received is displayed. The same times are programmable as with the preceding PTT ID.

Alternating Display - The checked display options are shown in sequence for the indicated display time in each option followed by the channel alias while the call is active. With this option the channel alias is displayed for the same interval as the previous option display.

Other

Disable PTT Queuing (Camp-On) - When selected, the PTT switch cannot be held down while a message is being received in order to immediately access the system when it is finished.

System Access (Busy) **Queuing** - When selected, telephone and unit calls are placed in a queue if the radio system is busy when the PTT switch is pressed. An alert tone then sounds when the call can be placed. This feature is currently not implemented.

Auto Registration - When selected, auto-registration is enabled which causes the radio to automatically register on the current Multi-Net site with the strongest signal. If this is not selected, registration does not occur until the PTT switch is manually pressed.

Priority Call Alert - An audible tone tells the user he is receiving priority traffic and not just a standard scan channel. Although this feature is active for all systems, it is particularly applicable for the 5100 ES Model I radios.

Kill Setting - This selects if the radio can be disabled if it becomes lost or stolen. If disabling is allowed, the ability to interrogate the radio can also be enabled or disabled.

Talk Back Scan - When the PTT switch is pressed to respond to a message in the group scan mode, selects if the transmission always occurs on the Selected, Active, or Last Received group. When not scanning or if no message is being received, transmissions always occur on the selected group.

8.1.2 Radio Wide Lists

The various Multi-Net radio wide lists are programmed by selecting them in the **Radio Wide Lists** drop-down list shown in Figure 8.1 and then clicking the Edit List button. Descriptions of the various lists and the information they program follow.

8.1.2.1 Phone List

The Phone List screen shown in Figure 8.2 allows the user to program a list of phone numbers that can be recalled for Multi-Net telephone calls.

Figure 8.2 System Alias / Phone List Screen

No	Alias	Phone
1	G BROWN	9725551234
2	K JONES	2145559876

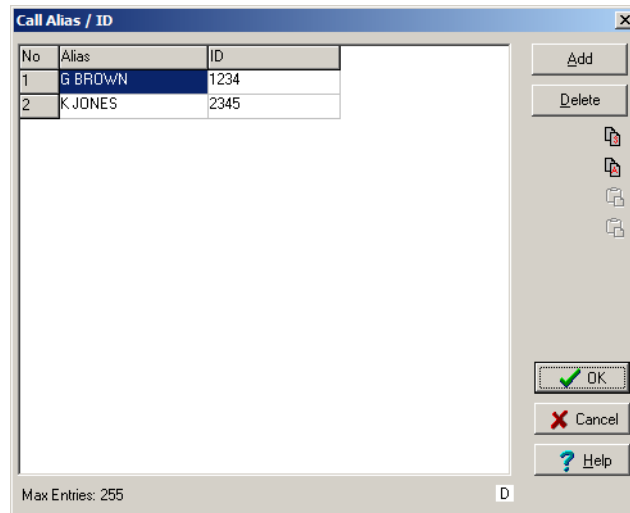
Max Entries: 16

Up to 16 numbers can be stored. Each number can be up to 16 digits. The * and # characters cannot be stored. To store a pause, enter a “p” or “P”. Numbers up to the pause are sent, a short delay occurs, and the remaining numbers (or the numbers to the next pause) are sent. A pause counts as one character. The alias can be up to ten alphanumeric characters.

8.1.2.2 Unit Call List

The Unit Call List screen shown in Figure 8.3 allows the user to program the list of numbers that can be recalled for Multi-Net Unit/Unique ID and Directed Group calls.

Figure 8.3 Call Alias / ID List Screen



Up to 255 numbers can be stored. Individual (Unique) IDs for unit calls are four or seven digits in length, and Directed Group call numbers are five or eight digits in length. The longer number is required if the call is to another site and the three-digit site ID must be specified. The alias can be up to ten alphanumeric characters. Refer to the operating manual for more information on these numbers.

8.1.2.3 Status List

The Status List screen shown in Figure 8.4 allows the user to program up to eight status messages that can be selected. The message assigned to each number should be the same as that programmed in the dispatcher console. Each message can be up to ten alphanumeric characters.

Note *A button or menu option is required to allow the user to change the current status message.*

Figure 8.4 Status Alias List Screen

No	Alias
1	ON PATROL
2	AT LUNCH
3	OFF DUTY

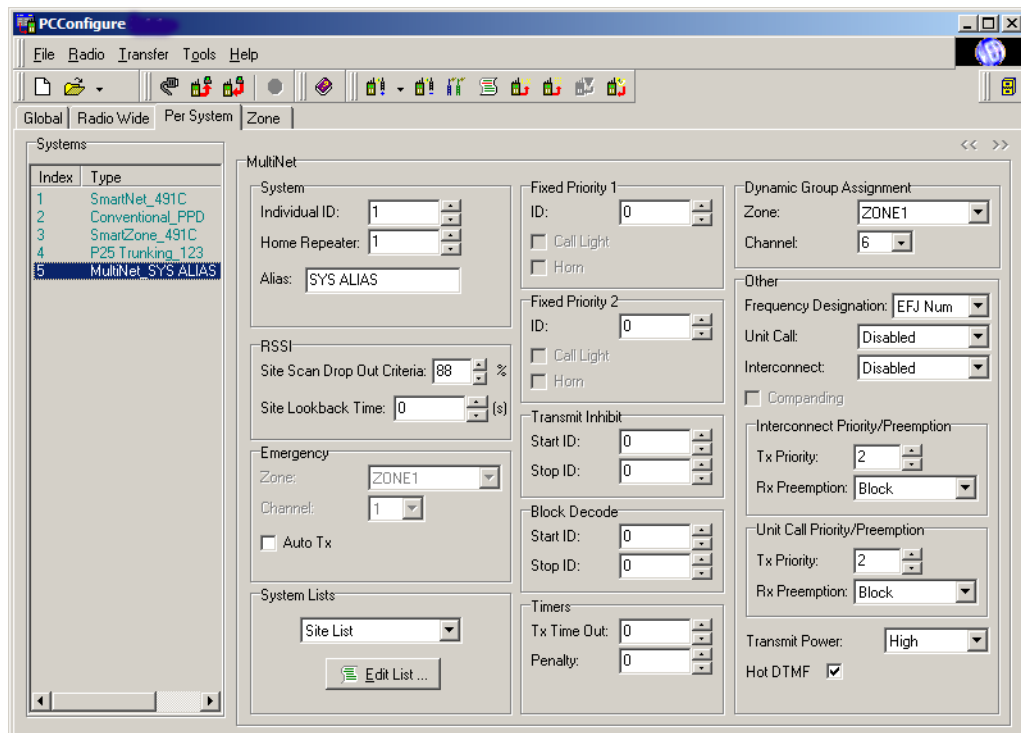
Max Entries: 8

8.2 Per System Screen

8.2.1 Multi-Net System Parameters

You can program individual system parameters using the **Per System** screen shown in Figure 8.5. These parameters can be programmed after the desired systems have been set up as described in Section 1.10.

Figure 8.5 Multi-Net Per System Screen



The parameters on the Multi-Net **Per System** screen are as follows:

System

Individual (Unique) ID - Programs the individual ID of the radio when the system is accessed.

Home Repeater - Programs the home repeater number of the system. This number plus the channel group ID determine the mobile or group of mobiles that receive a group call.

Alias - Programs the alias of the system. This alias is used as an identification aid when programming Zones and Channels and is not displayed on the radio.

RSSI

Site Scan Drop Out Criteria - Programs the percentage of good data messages that must be received to stay on the site when roaming. The higher this setting, the sooner roaming occurs because fewer bad messages are permitted. Set 25 to 100% in 3 percent increments. The default is 25%.

Site Look Back Time - For Ascend radios, the response time controls the site sample option. Site sampling is performed at this interval (ten second minimum) while the RSSI is below Good but above Acceptable. Site sampling allows the Acceptable setting to be lower to extend the coverage area yet allowing a better site to be acquired if signal quality permits. Site sample is suspended if the radio is active with a call, during scan delay after a call, if only one site is programmed, during interconnect and unit calls, while emergency is active, or while radio wide scan is enabled. Set the Look back time to 0 to disable this feature.

Emergency - Sets the Zone and Channel selected when an emergency event is initiated.

Note *The Emergency Zone and Channel may be set on the Global page. In this case the Zone and Channel are not editable and only the Auto Transmit parameter for the current system is enabled for edit. A button, menu or I/O item must be programmed to access the emergency function.*

Zone - Select the Zone on which an emergency is transmitted when a channel linked to that system is selected.

Channel - Selects the Channel on which an emergency is transmitted when a channel linked to that system is selected. Any type of programmed channel can be selected and the emergency responds according to that channel type (such as Multi-Net, Conventional, SMARTNET).

Auto Tx - When selected, emergency messages are automatically transmitted, and when not selected, they must be manually transmitted. If the global or system emergency zone/channel is a Multi-Net channel assigned to the system, this option determines the auto/manual mode of that emergency zone/channel. Otherwise, this parameter is ignored.

System Lists - Refer to Section 8.2.2 for more information.

Fixed Priority 1 - Programs the fixed priority 1 Group ID that is received regardless of which of the system's channels are selected.

Note *The Fixed Priority 1 Group ID does not have to be included as a selectable channel. Enter 0 to disable this function.*

Fixed Priority 2 - Programs the fixed priority 2 Group ID that is received regardless of which of the system's channels are selected.

Note *The Fixed Priority 2 Group ID does not have to be included as a selectable channel. Enter 0 to disable this function.*

Transmit Inhibit - Programs the Transmit Inhibit ID block of IDs which can include up to all 225 IDs. When the selected channel Group ID is in this range and an ID within this block is detected up to five seconds before the PTT switch is pressed, the transmitter does not key. A valid receive ID that is in this range that opens the receive audio does not inhibit transmit. Enter “0” to disable this feature.

Start ID - Number at which to start the ID range.

Stop ID - Number at which to stop the ID range.

Block Decode - Programs a block of ID codes up to all 225 on which calls are received regardless of what system channel is selected. Enter “0” to disable this feature.

Start ID - Number at which to start the ID range.

Stop ID - Number at which to stop the ID range.

Timers

Transmit Time Out - Programs the time-out timer for 15-225 seconds. Programming “0” disables this timer.

Penalty - Programs the penalty timer for 15-225 seconds. Programming “0” disables this timer. This timer disables the transmitter for the programmed time after it is disabled by the time-out timer.

Dynamic Group Assignment - The Ascend radio allows the Dynamic Group Assignment to be any Zone and Channel assigned to the current Multi-Net system. The assigned channel becomes the “group 11” channel used in previous radios. With the Ascend radio, the System number transmitted by the dispatcher is the System Index number of the system from this screen. If an invalid zone and channel are selected, an alert indicator (a red triangle) appears next to the Dynamic Group Assignment line. A valid zone/channel combination must be selected before programming the radio.

Zone - Programs the Zone containing a Multi-Net channel that is reprogrammable over the air by the Dynamic Reassignment command.

Channel - The referenced Multi-Net Channel in the Zone previously programmed is reprogrammed over the air by the Dynamic Reassignment command. Any Multi-Net channel of the available 16 channels per zone can be selected.

Other

Frequency Designation - Selects if the Status and Home repeater channel numbers programmed in the Site List are entered as Channel Numbers from the Programming Channel List at the end of this manual or as the actual channel frequencies in megahertz. See Section 8.2.2.1, “Site List” for more information.

Unit Call - Programs the permission for placing and receiving unit calls on the system. These calls can be Disabled, Response Only, or Send/Receive. This also applies to placing Directed Group calls because they are placed as unit calls and received as Group calls. If unit calls are allowed a button or menu item must also be programmed to allow calls to be answered or placed.

Interconnect - Programs the permission for telephone calls similar to unit calls just described. If interconnect calls are allowed a button or menu item must also be programmed to allow calls to be answered or placed.

Interconnect Priority/Preemption

Tx Priority - Transmit Priority. Sets the access priority for interconnect (telephone) calls on the system for 2-5 (“2” programs the highest priority). Priority “1” is reserved for emergency calls.

Rx Preemption - Receive Preemption. Selects which active calls an interconnect call can interrupt. For example, if Group Scan is selected, only Group Scan and Block calls are interrupted, selected and fixed priority calls will not be interrupted.

1. Fixed Priority 2
2. Selected
3. Group Scan
4. Block

Unit Call Priority/Preemption - Sets the Transmit Priority and Preemptions for unit calls similar to interconnect calls just described.

Tx Priority - Transmit Priority. Sets the access priority for unit calls (unique ID calls) on the system for 2-5 (“2” programs the highest priority). Priority “1” is reserved for emergency calls.

Rx Preemption - Receive Preemption. Selects which calls unit calls can interrupt. Similar to interconnect Calls.

1. Fixed Priority 2
2. Selected
3. Group Scan
4. Block

Transmit Power - Fixes the transmit power for the system for the high or low level or makes it selectable (the High/Low Power switch is then required).

Hot DTMF - When selected, the radio allows interconnect and unit call attempts with no phone or unit call digits selected. This option supports Ascend mobiles with DTMF mics allowing the user to manually over-dial DTMF digits.

8.2.2 System Lists

Program the various Multi-Net system lists by selecting them in the **System Lists** drop-down list shown in Figure 8.5 and then clicking the **Edit List** button. Descriptions of the various lists and the information they program follow.

8.2.2.1 Site List


The Site List screen shown in Figure 8.6 allows the user to program the sites that are linked to the system. Up to 32 sites can be linked to each Multi-Net system. To display this screen, on the Multi-Net **Per System** screen, select “Site List” in the drop-down list and then click the  button.

Figure 8.6 Multi-Net Sites Screen

To add a site, click the **Add** button, and to delete a site, select it and click the **Delete** button. To edit a site, select it and change it as desired. The following site information is programmed:

Alias - Up to ten characters can be entered that identify the site. This identification is displayed when the site is selected or displayed using the Site Search feature.

Key - This is the unique site key that is programmed in both the radio and site repeaters to prevent unauthorized use of the system. This key is provided by the EFJohnson Company. For security purposes, the actual key is never displayed and is represented by asterisks (*****).

NPSPAC Banding Scheme - Selects how the NPSPAC channels are calculated. When set to High, the NPSPAC channels begin at 866.000/821.0000 MHz (EFJ channel numbers 601 and higher). When set Low, the NPSPAC channels begin at 851.0125/806.0125 (EFJ channel numbers 1-239) and comply with the 2005 FCC rebanding scheme.

Splinter Channels - Selects if channels are offset 12.5 kHz on the low side. This channel offset may be required for non-NPSPAC 800 MHz channels in some border areas.

Status

Tx Channel Number - Transmit Channel Number. Programs the transmit channel number or frequency of the status repeater for the site. The system Channel Designation parameter determines if this is entered as a frequency or EFJ Channel number (see description which follows).

Rx Channel Number - Receive Channel Number. Programs the receive channel number or frequency of the status repeater for the site. The system Channel Designation parameter determines if this is entered as a frequency or EFJ Channel number (see description which follows).

If EFJ channel numbers are used, be sure to use the EFJ Programming Channel Number, not the FCC Channel Number. The FCC channel numbering scheme skips some channels in the NPSPAC portion of the band, so a different scheme must be used. The 800 MHz EFJ Programming Channels are listed in a table at the back of this manual.

Home

Tx Channel Number - Transmit Channel Number. Programs the transmit channel number of the home repeater for the site similar to the status channel just described.

Rx Channel Number - Receive Channel Number. Programs the receive channel number of the home repeater for the site similar to the status channel just described.

8.2.2.2 Group Scan List


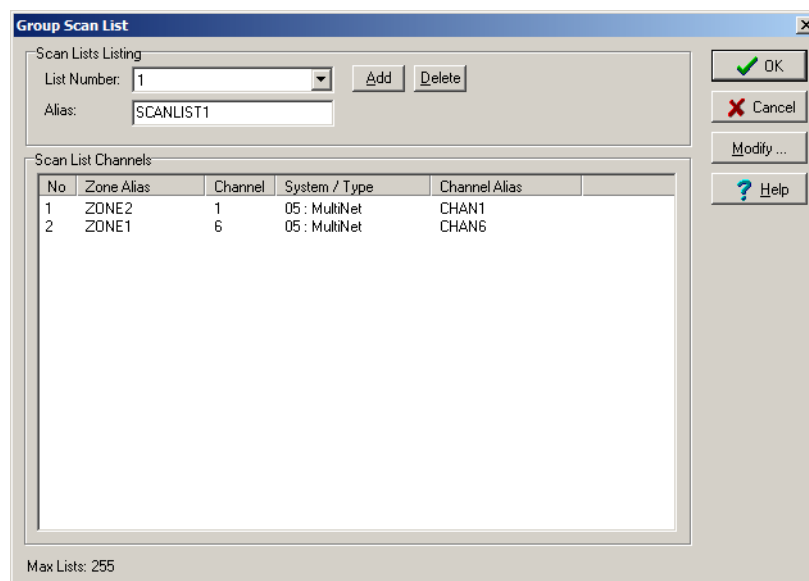
The Group Scan List screen shown in Figure 8.7 allows the user to program the channels in the group scan list for that system. Each Multi-Net system supports multiple group scan lists. Only Multi-Net channels linked to the system can be added. To display this screen, on the Multi-Net **Per System** screen, select “Group Scan List” in the drop-down list and click the  button. An option button or menu item must be programmed to allow the user to select the active list and to allow group scan enable.

Figure 8.7 Group Scan List Screen



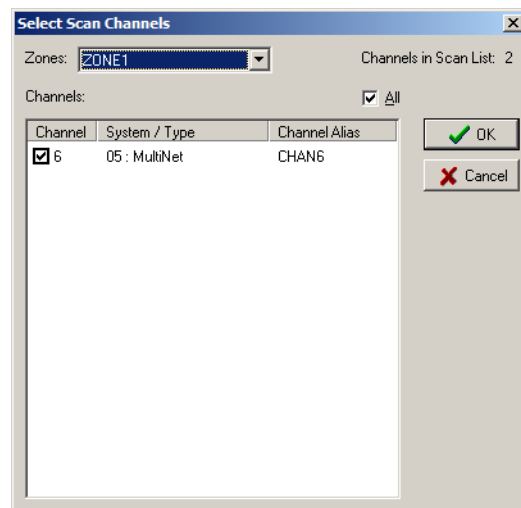
No	Zone Alias	Channel	System / Type	Channel Alias
1	ZONE2	1	05 : MultiNet	CHAN1
2	ZONE1	6	05 : MultiNet	CHAN6

Max Lists: 255

To edit this list, click the **Modify...** button and Figure 8.8 is displayed. Select the applicable zone in the drop-down list. A list of the Multi-Net channels in that zone that are linked to the current system is displayed. Click the **All** box to select all displayed channels or click the box in the **Channel** column to select individual channels.

Ascend radios support multiple group scan lists. Each list may be programmed with an alias and up to 32 channels from the current system. A maximum of 255 lists may be programmed. With this option, add lists using the **Add** button, or select the desired list number in the drop-down list box and select **Modify** to edit the list. Channels must belong to the same Multi-Net system to be included in the group scan list.

Figure 8.8 Select Scan Channels



8.3 Setting Up Zones and Channels

This section describes how to set-up zones and assign channels to each zone. A zone can include up to 16 channels of any type (conventional analog, Project 25 conventional, SMARTNET/SmartZone, Project 25 Trunked, or Multi-Net).

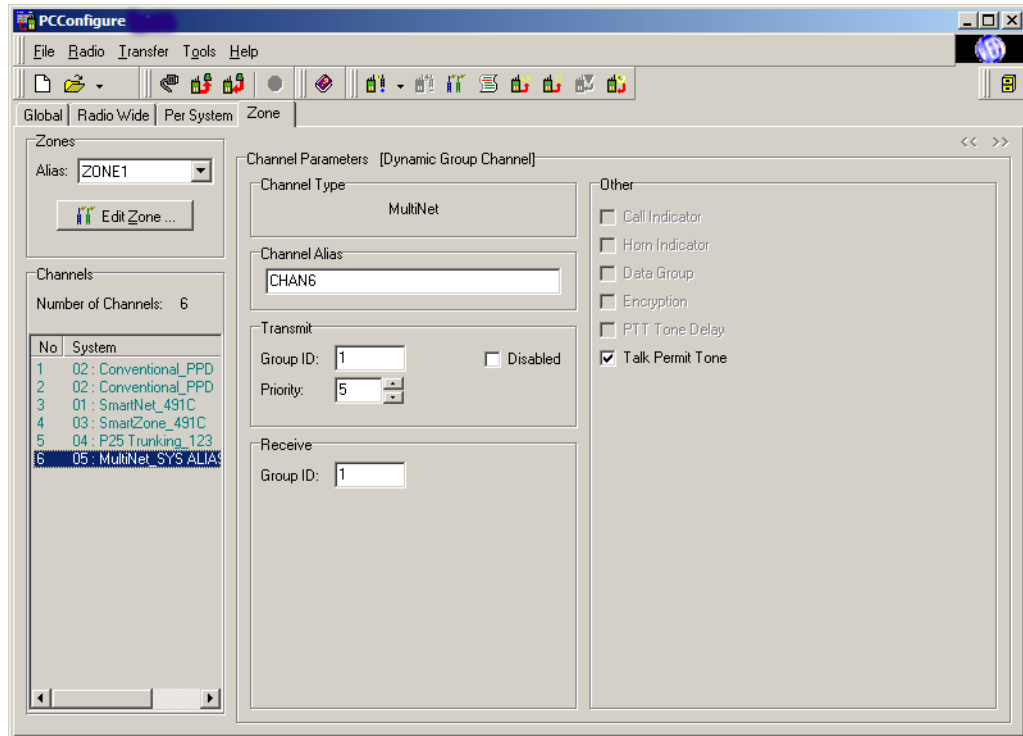
8.3.1 Setting Up Zones

With the Ascend portable and mobile radios, a maximum of 32 zones for up to 512 channels can be programmed if the “512 Talkgroups/Channels” feature option has been enabled. To determine if this feature is enabled, refer to the **Transfer → Read Options** Screen. Otherwise, a maximum of 16 zones (256 talk groups) can be programmed.

8.3.1.1 Setup Procedure

- 1 Select the **Zone** tab to display the Zone screen shown in Figure 8.9. (This screen varies according to the type of system.)

Figure 8.9 Multi-Net Zone Screen





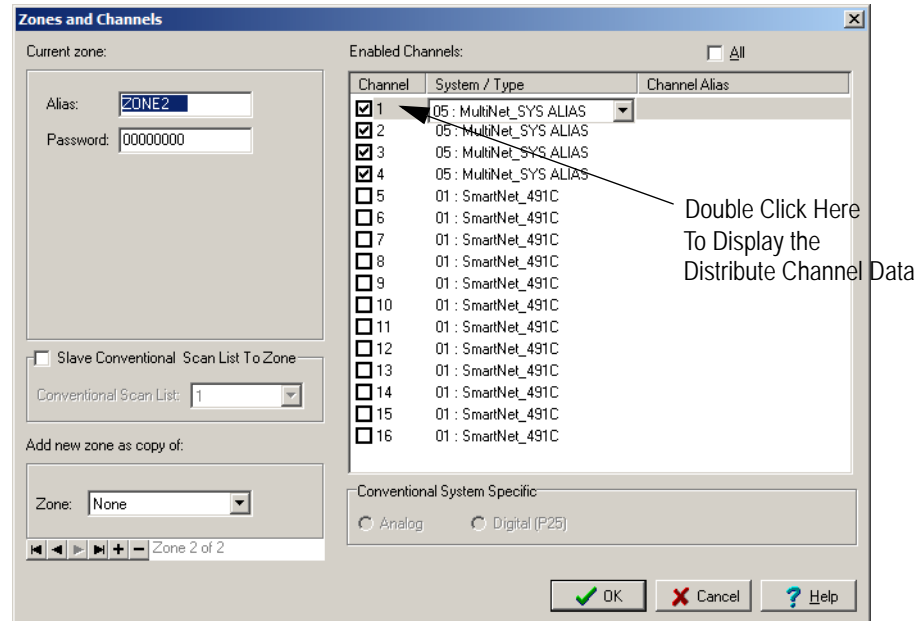






Click  in the upper left corner of the screen to display the **Zones and Channels** screen shown in Figure 8.10. Another way to do this is to click  in the toolbar.

Figure 8.10 Zones and Channels Screen



- 2 To add a new blank zone, select “None” in the Zone drop-down list and then click the  button. To make a copy of a current zone, select the desired zone in the Zone drop-down list instead. To delete the current zone, click the  button.
- 3 To display the first zone, click ; the last zone ; the previous zone ; and the next zone, .
- 4 Program the alias (identification) that is displayed briefly when you select the zone. To do this, enter a maximum of ten characters in the **Alias** box.
- 5 Keypad Programming and Zone Password are not supported for Multi-Net. Refer to Section 11. To program these passwords, enter any eight numbers from 0-9. If you do not wish to program this password for the zone, simply leave this field all zeros.

8.3.2 Setting Up Channels

Note When you assign a channel to a zone, you also select the system of the channel. Therefore, before assigning a channel to a zone, set up all necessary systems as described in Section 1.10.

Set up channels by assigning them to a zone in the Zones and Channels screen shown in Figure 8.10. Proceed as follows to set up any type of channel.



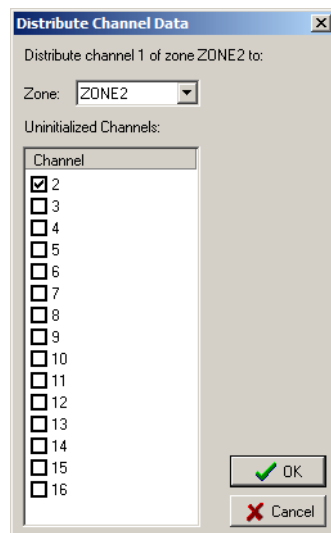
- 1 Select the **Zone** screen (see Figure 8.9) and then click  to display the **Zones and Channels** screen shown in Figure 8.10. Another way to do this is to click  in the toolbar.
- 2 Select the desired zone as described in the preceding section.
- 3 To add a channel to the displayed zone, check the applicable box in the **Channel** column. To select or deselect all channels in the box, check or uncheck the **All** box.
- 4 To assign the channel to a system (if applicable), select the drop-down list in the **System/Type** column and select the desired system. To assign multiple channels to a system, left click a channel and drag the cursor to highlight the desired channels. Then select the system from the drop-down list.
- 5 To copy an enabled channel to unprogrammed channels of the current zone or other zones, double click the shaded area of the channel as shown in Figure 8.10. The **Distribute Channel Data** screen shown in Figure 8.11 is displayed. Select the desired channels from this screen.

Figure 8.11 Distribute Channel Data

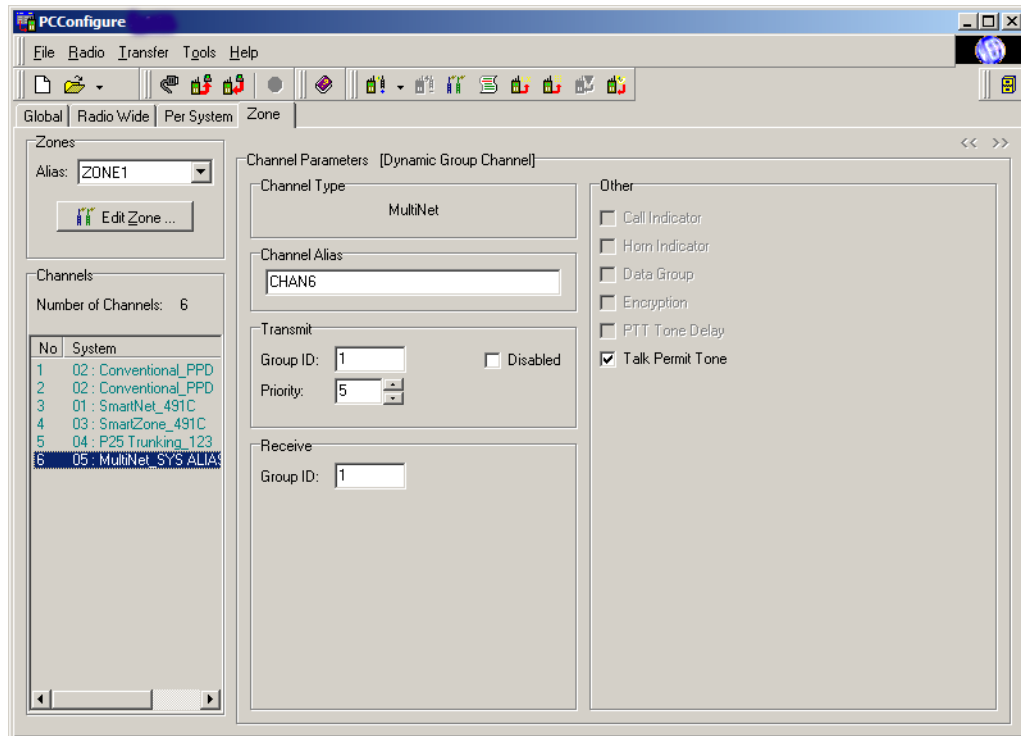


- 6 Repeat the preceding steps until the you have set up desired channels in each zone.
- 7 To program individual system and channel information, refer to Section 8.3.3.

8.3.3 Multi-Net Channel Parameters

After you set-up your desired channels as described in Section 8.3.2, you can program individual channel parameters. Select the **Zone** screen shown in Figure 8.9, then select the desired zone using the drop-down menu in the **Zones** box. Select screens that program individual channel parameters by clicking the desired channels in the **Channels** box.

Figure 8.12 Multi-Net Zone Screen



Channel Type - Indicates the type of channel (Multi-Net) that is currently selected in the **Channels** box.

Channel Alias - Programs the alias (identification) that is displayed when the channel is selected. A maximum of ten alphanumeric characters can be entered.

Transmit

Group ID - Programs the encode ID from 1-225.

Disabled - When selected, transmitting is disabled on the group so it is monitor only.

Priority - Selects the access priority of the group from 2-5 ("2" is the highest priority). Priority "1" is reserved for emergency calls.

Receive

Group ID - Programs the decode ID from 1-225. The receive and transmit IDs can be different if desired.

Other

Call Indicator - The Call Indicator feature is not available.

Horn Indicator - (Ascend Mobile Only) When selected, the Horn alert feature activates when a call is received on the channel.

Data Group - (Ascend Mobile Only) A channel enabled for Data Group disables Receive audio to the speaker preventing the user from hearing in-band data transmissions. Receive and transmit audio for this channel is provided over the universal interface cable.

Encryption - Analog encryption for Multi-Net channels is not supported.

PTT Tone Delay - Not currently used because encryption is not available on Multi-Net channels. This delays the following Talk Permit Tone for a short time when encryption is used to ensure the receiving radio has time to detect the call.

Talk Permit Tone - When selected, the Talk Permit Tone sounds when the radio system is successfully accessed and speaking can begin. If this is not selected, no tone sounds when this occurs.

SECTION

9

Programming Scanning

The types of scanning that can be programmed are Radio Wide, Priority (Standard), Group Scan (Multi-Net) and Vote Scan.

Radio Wide Scan - Use this type when two or more types of channels must be scanned at the same time such as conventional and Project 25 trunked. If this is not a requirement, use the more efficient Priority Scan (or Group Scan for Multi-Net) which follows because there is less chance of missed calls.

Priority Scan (Standard) - Use this type to monitor only channels that are the same type as the selected channel. For example, if a conventional channel is selected, only conventional channels can be scanned. Trunked channels must also belong to the system of the selected channel.

Group Scan (Standard for Multi-Net) - The Multi-Net group scan feature monitors the Multi-Net groups in the scan list of the selected system (home channel). This list can include up to 32 channels (groups) linked to that system. This type of scan monitors only channels that are the same type as the selected channel.

Vote Scan - Vote scan uses repeater RSSI levels to determine (vote) which repeater the call will be assigned to.

9.1 Programming the Radio Wide Scan Mode

- 1 On the **Radio Wide** screen, program the Radio Wide Scan List and Scan Hold time as described in Section 2.4.1. You must set up the channels that you want to include in the scan list as described in the *Setting Up Zones and Channels* section for system.
- 2 Program the **Radio Wide Scan** option button by clicking the **Assign Buttons** button on the **Radio Wide** screen as described in Section 2.4.3. With 51xx portables, a Radio Wide Scan menu parameter can also be programmed as described in Section 2.4.2.

9.2 Programming the Priority Scan Mode

You set up Priority scan on the **Per System** screen because it is unique for each system type. Proceed as follows:

- 1 On the **Per System** screen, select the desired system in the left pane.
- 2 In the System Lists drop-down list near the bottom of the screen, select **Priority Scan List**. Then click the **Edit List** button and program the scan list as described in Section 5.2, 6.2 and 7.2. You must set up the channels that you want to include in the scan list as described in the *Setting Up Zones and Channels* section for system.
- 3 With conventional channels, program the per system scan list settings on the **Per System** screen. There is also the option to link a particular scan list to a zone. Refer to Section 5.2.2 for more information.
- 4 Repeat the preceding steps for each system that will have Priority Scan function.
- 5 With trunked channels (SMARTNET/SmartZone/Project 25), you may need to program each channel to select a scan list and auto scan. Select the **Zone** screen and program this information for each channel if required (Sections 8.3 and 9.3).
- 6 Program the Scan option button by clicking the **Assign Buttons** button on the **Radio Wide** screen as described in Section 2.4.3. With 51xx portables, a **Scan** menu parameter can also be programmed as described in Section 2.4.2.

9.3 Programming the Group Scan Mode

Group scan is set up on the **Per System** and **Radio Wide** screens for Multi-Net systems. Each Multi-Net system may be programmed with multiple named group scan lists. Proceed as follows:

- 1 On the **Per System** screen, select the desired system in the left pane.
- 2 In the System Lists drop-down list near the bottom of the screen, select “Group Scan List”. Then click the **Edit List** button and program the scan list as described in Section 8.2.1. The channels (groups) to be included in the scan list must have been set up as described in Section 8.3.3.
- 3 Repeat the preceding step for each system that will have the Group Scan function.
- 4 On the **Radio Wide** screen, select “Multi-Net” in the left pane and program the Scan Delay Timers and Talk Back Scan option as described in Section 8.1.1.
- 5 Also on the **Radio Wide** screen, program the Group Scan option button by clicking the **Assign Buttons** button. A Group Scan menu parameter can also be programmed. Refer to Section 8.1.1 for more information.

9.4 Vote Scan Programming

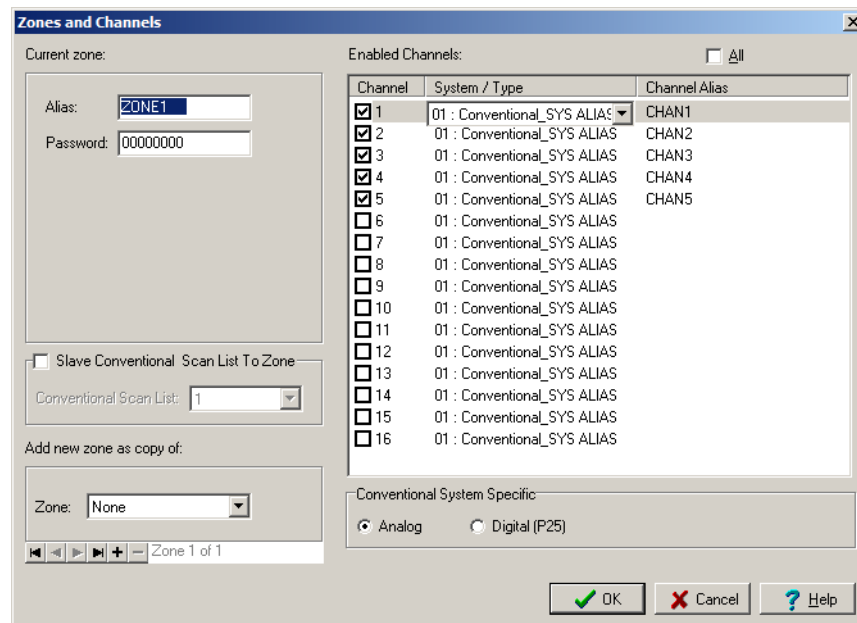
This section describes how to program the Vote Scan option for a conventional system. System requirements for this option include:

- PC Configure version 2.1.0 or higher.
- Conventional Vote Scan system information (frequency pairs, etc.)

The steps to program Vote Scan in PC Configure are:

- 1 Open a new PCC file for the desired subscriber type (5100/5300) and desired frequency band.
- 2 From the **Zone** tab, select the **Edit Zone** button. Figure 9.1 is displayed.

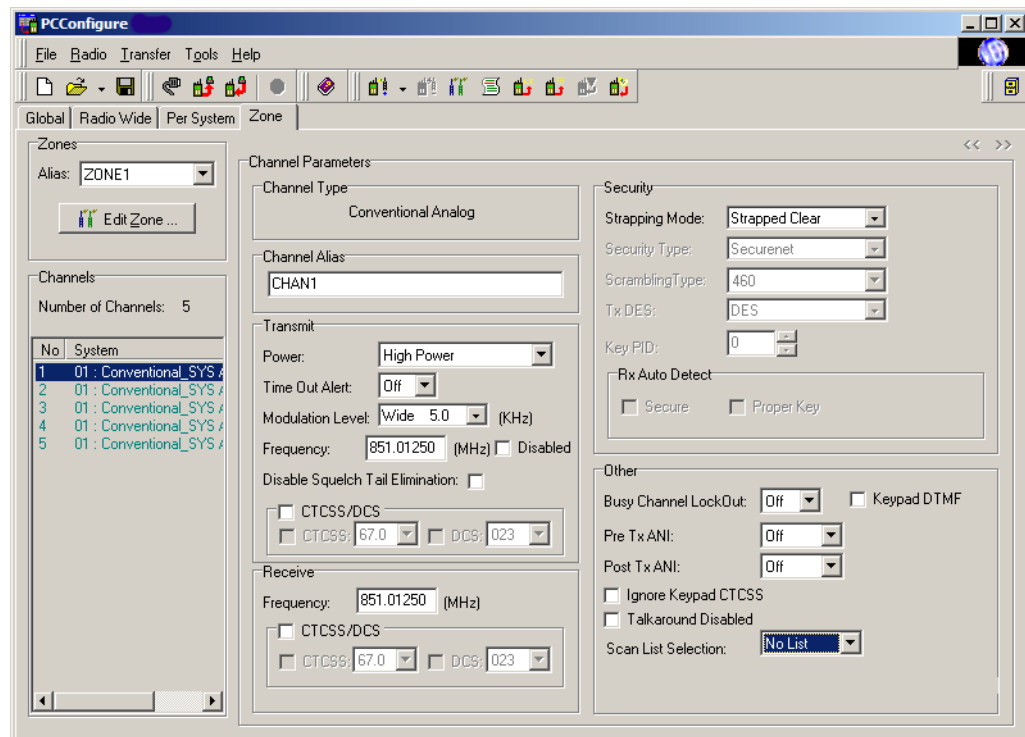
Figure 9.1 Zones and Channels Screen



- 3 Enable the desired number of channels supported by the Vote Scan system. A five-channel vote system is shown in this example (Figure 9.1).
- 4 Select the check box for each channel location. Highlight each channel and designate that channel as either Analog or Digital.
- 5 Select **OK** after all desired channel locations have been selected.

- 6 The **Zone** page is now populated with the selected channels. (See Figure 9.2.)

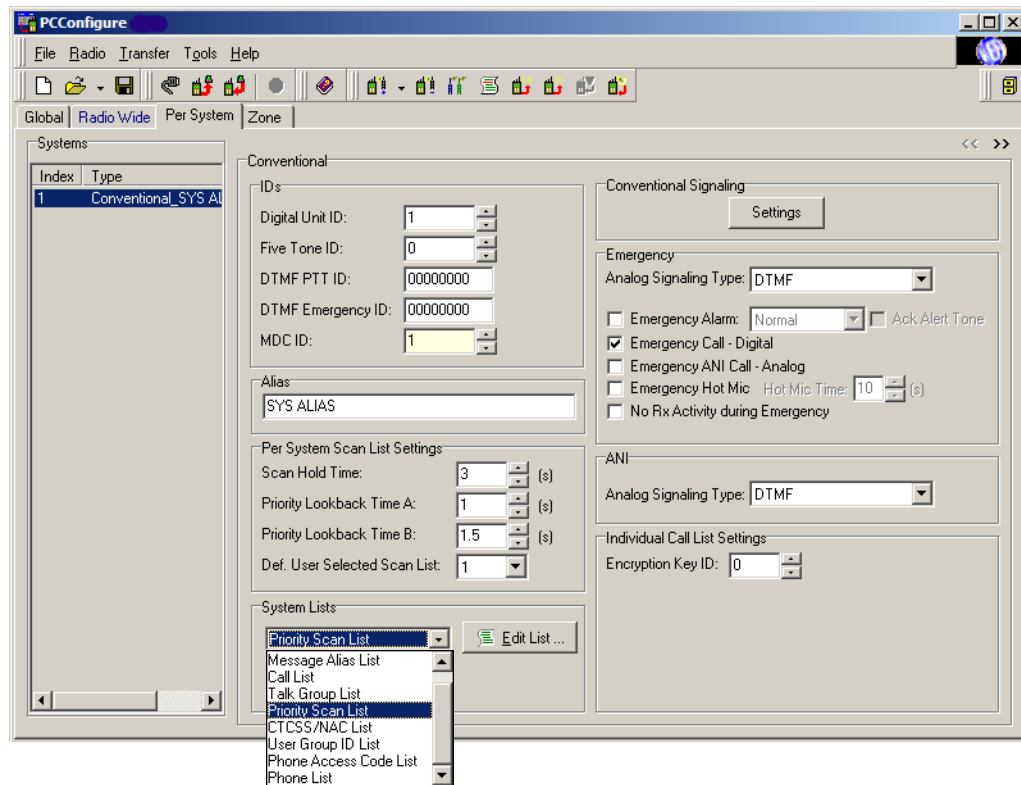
Figure 9.2 Zone Screen with Channels Selected



- 7 Highlight each channel location in the left hand column and populate each location with the repeater pair frequencies and settings for all station's part of the Vote Scan system.

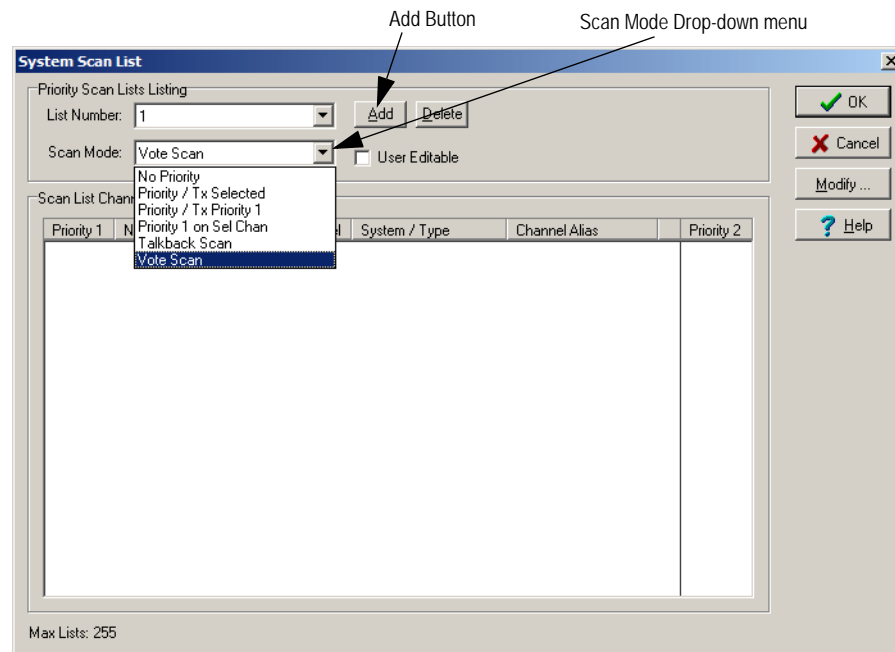
- 8 From the **Per System** tab, in the **System Lists**, select “Priority Scan List”.

Figure 9.3 Per System: System Lists Drop-down Menu



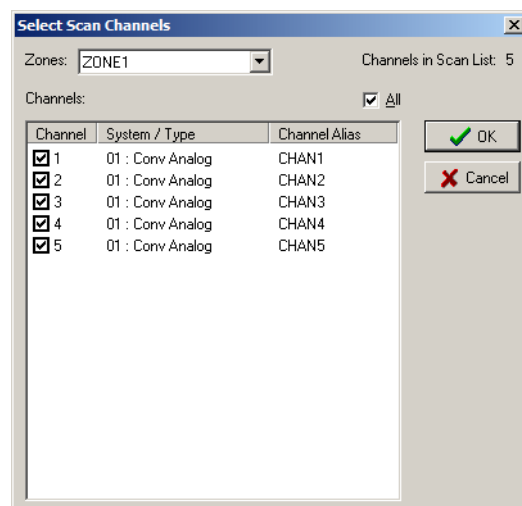
- 9 The following screen is displayed. Select the **Add** button to enable a scan list. For this example, only one scan list will be enabled.

Figure 9.4 System Scan List



- 10 Under the **Scan Mode** drop-down window on the **System Scan List** screen, select **Vote Scan**. See Figure 9.4.
- 11 Select the **Modify** button to populate the scan list. The **Select Scan Channels** screen is displayed.

Figure 9.5 Select Scan Channels



- 12 Select each channel location programmed with the Vote Scan station repeater pair frequencies. (See Figure 9.5.)

- 13 Select the **OK** button to save the selected channels to the scan list. The scan list is now populated with the desired channels. (See Figure 9.6.)

Figure 9.6 Populated System Scan

System Scan List

Priority Scan Lists Listing

List Number:

Scan Mode: ☐ User Editable

Scan List Channels (Check to set priority)

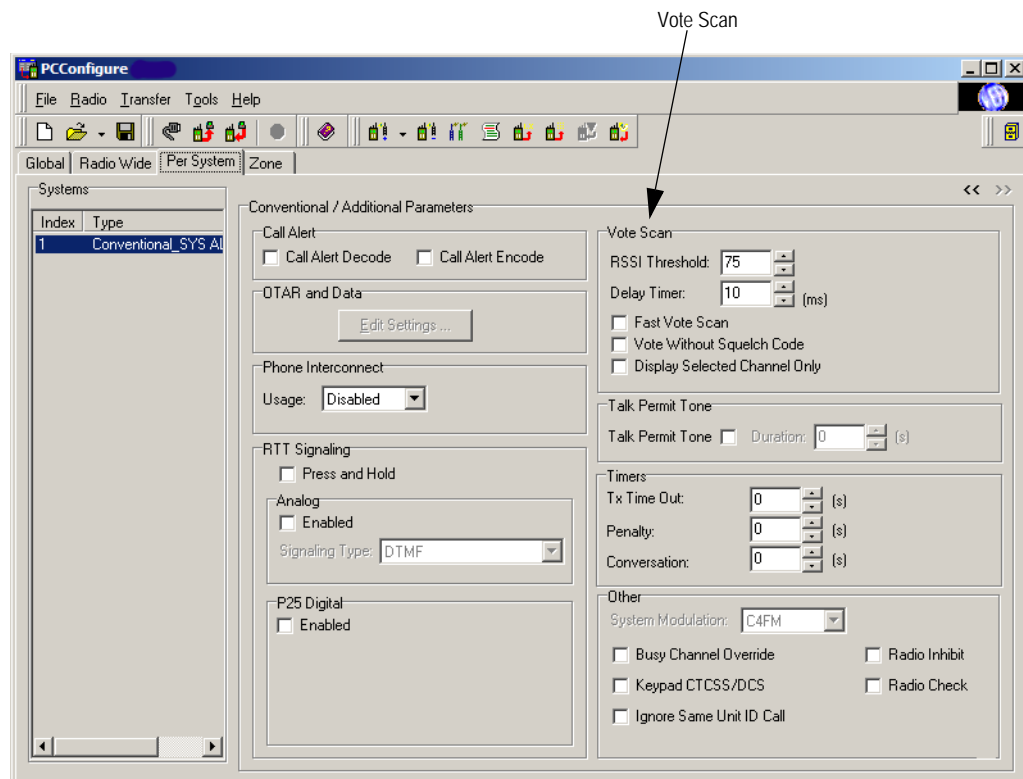
Priority 1	No	Zone Alias	Channel	System / Type	Channel Alias	Priority 2
<input type="checkbox"/>	1	ZONE1	1	01 : Conv Analog	CHAN1	<input type="checkbox"/>
<input type="checkbox"/>	2	ZONE1	2	01 : Conv Analog	CHAN2	<input type="checkbox"/>
<input type="checkbox"/>	3	ZONE1	3	01 : Conv Analog	CHAN3	<input type="checkbox"/>
<input type="checkbox"/>	4	ZONE1	4	01 : Conv Analog	CHAN4	<input type="checkbox"/>
<input type="checkbox"/>	5	ZONE1	5	01 : Conv Analog	CHAN5	<input type="checkbox"/>

Max Lists: 255

- 14 Select the **OK** button to save the scan list.

- 15 In the upper right corner of the **Per System** screen, click on the double arrows to show Page 2 of the **Per System** screen. (See Figure 9.7.)

Figure 9.7 Per System Additional Parameters



- 16 Set the **Vote Scan** settings as desired. (Cross reference with current system settings, descriptions below).

RSSI Threshold - The signal strength threshold the radio will use to determine whether to switch or stay on the current repeater.

Delay Timer - Delay setting to allow the carrier to come up on all repeaters so that voting on signal strength can occur.

Fast Vote Scan - If this feature is selected and the signal strength level for the current repeater is above the RSSI threshold setting, no additional voting will occur and the current repeater will be used.

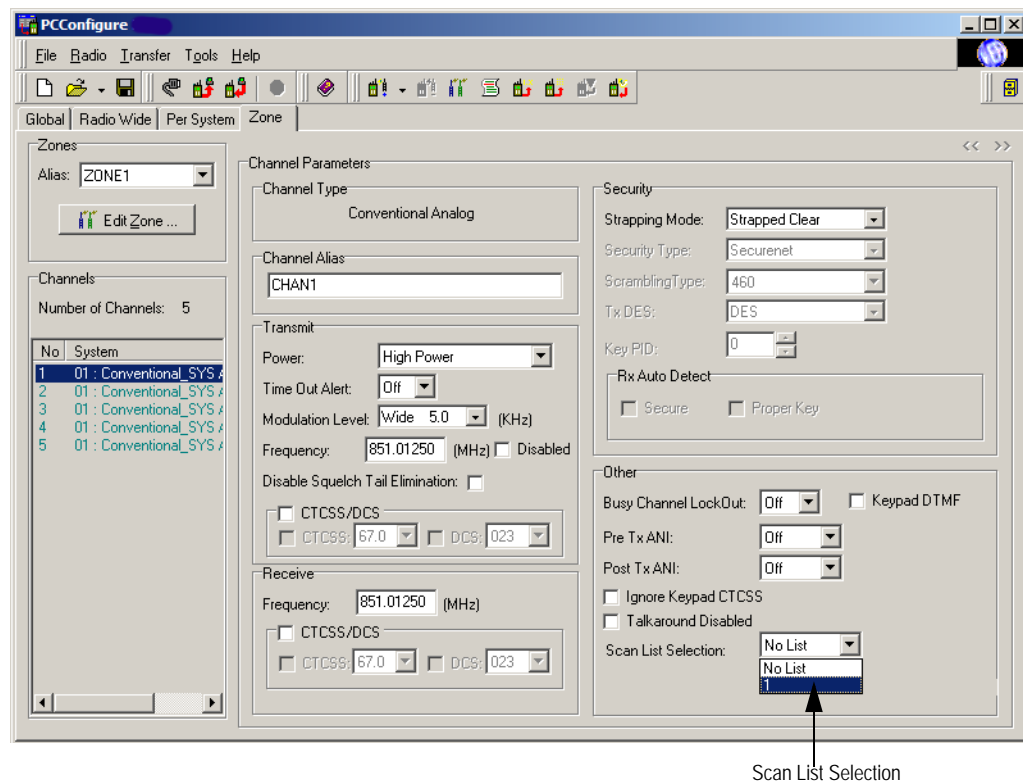
Vote Without Squelch Code - CTCSS/DCS setting will be ignored when determining which repeater to use.

Display Selected Channel Only - Selecting this field forces the radio to display the selected channel and to not display the repeater ID used once it is voted.

- 17 Select the **Zone** tab once again.

18 Highlight the first channel in the left column. (See Figure 9.8.)

Figure 9.8 Zone Screen



19 Go to the **Scan List Selection** drop-down menu in the lower right corner of the page. Select “Scan list 1”. (Only selection possible for this example.)

20 Duplicate this setting on the additional channel locations tied to the Vote Scan system.

21 After other programming settings are made (Global, Radio Wide or Per System settings), save the file and download to the appropriate EFJ subscribers.

Note The **Scan List Select** function button/menu item cannot be programmed or used without a **Vote Scan** configuration file.

SECTION 10

Password Description

This section contains the following information about passwords:

- Password enhancements
- Programming passwords
- Password description
- Zone password

10.1 Password Enhancements

51xx/Ascend portables and 53xx/Ascend mobiles have an enhanced password feature. You can assign more passwords. Also, more functions can be under password control. The following passwords replace the single Power-On password:

- Four power-on (User x) passwords
- Download and upload passwords
- Master password

10.2 Programming Passwords

With the latest versions of PC Configure, the **Password at Power Up** parameter is removed from the **Global** screen as described in Section 10.1. You program passwords using a password management screen displayed by the **Tools → Password Management** menu. Refer to Section 3.4. You must power-up the radio and connect the radio to the computer to display this screen.

PC Configure transfers password data and stores it in an encrypted format for security purposes. In addition, PC Configure never displays actual passwords. They are always

indicated by eight asterisks (*****). Therefore, you cannot use PC Configure to determine what passwords are in a radio.

Passwords must be 1-8 characters in length and consist of the numbers 0-9. Zeros are valid characters in any location, even as leading characters. Initially, all passwords are null (deleted) characters. Therefore, when you first program a password, you do not need to make an entry in the **Original/Master Password** box.

10.2.1 Lost Passwords

If you lose a password, you can change it using PC Configure by entering the master password, as Section 10.3.3 describes. If the master password is lost or was not used, you can erase all passwords using the PCTune software as follows:

- 1 With PCTune 1.1.1.0 or later, simply select **Radio → Reset Passwords**. Only password information is erased.
- 2 With earlier versions of PCTune, after starting the PCTune program, press <Shift> <Ctrl> <E> to toggle the following **Erase EEPROM** function. Otherwise, it is grayed and you cannot select it. Then select **Radio → Erase EEPROM → Params Only**. This erases all password and personality information, so you must then reprogram the radio.



*Do not select **COMPLETE** because that erases all information. Then, you must send the radio back to the factory to make it usable again.*

10.2.2 Changing Password

A user can change an assigned password only if the **Set User Password** option button or menu parameter is programmed on the radio. Selecting this function displays prompts for entering and confirming a new password.

Note *With the 51xx/Ascend portable and 53xx/Ascend Handheld Control Unit (HHC), you should not use a number key for this function. This is because you exit the password mode if you press the assigned key when you enter a number.*

10.2.3 Password Entry Procedure

When the radio prompts you to enter a password, perform the following procedure to enter it:

51xx Portable - With DTMF keypad models, enter each number using the keypad and press the <F2> key after you enter the last digit. With limited keypad models, enter each number by pressing the Up/Down switch and press the <F2> key after each digit.

53xx Mobile - Rotate and press the **Select** switch.

10.3 Password Description

This section contains descriptions of the following types of passwords:

- User (power-on) passwords
- Download/Upload passwords
- Master password

10.3.1 User (Power-On) Passwords

When you enable a user password, you must enter it each time you turn on the radio's power. You can program a maximum of four different user passwords (User 1/User 2/User 3/User 4). The same radio features are enabled for each. When you enter any user password at power up, you enable normal radio operation.

10.3.2 Download/Upload Passwords

You can program separate download (write) and upload (read) passwords to prevent unauthorized downloading or uploading of radio programming parameters. Refer to Section 3.3. When you use either of these passwords, you must enter the proper password to perform the desired operation. You do not need a user password to upload or download parameters if you did not use the password option.

10.3.3 Master Password

The master password overrides all the preceding passwords. The system administrator can use it as a "pass key" to a password-controlled function or to change a lost or unintentionally-changed password. Master passwords are set up and changed the same as the other passwords. It does not override the zone password described in Section 10.4.

10.4 Zone Password

Note *The programming and use of the zone password has not changed. It is independent of the preceding passwords. You program it in the **Zone → Edit Zones and Channels** screen.*

You can program a zone password for the 53xx mobile and 51xx portable. It prevents unauthorized reprogramming of zones by keypad programming. When you use this password, you must enter it before you can change system or channel parameters in that zone. You program the zone password in the **Edit Zones and Channels** screen. To display this screen, click the **Edit Zone** button on the **Zone** screen. Refer to the section, Setting Up Zones, for the programmed system.


You can program a different password for each zone. When you select a password-protected zone, "PASSWORD" flashes the first time you try to select a system or channel parameter in that zone. You then enter each digit of the password as previously described. The password is always eight digits long. After you enter the eighth digit, you can program system and channel parameters for that zone normally.

SECTION 11

51xx Portable Keypad Programming

Note *Keypad programming is permitted for United States federal government users only. It is not permitted for any user regulated by the United States Federal Communications Commission (FCC). Refer to Section 3.3.*

Since only United States federal government users are permitted to use keypad programming, you can only program United States federal government models of this radio with this feature.

You can only use keypad programming if it has been enabled by factory programming and a conventional mode option switch or menu parameter is programmed for the **Keypad Programming** function. You then select it by simply pressing that switch or selecting that menu parameter. The keypad programming mode is indicated by “CHNG ZONE” and  in the display.

Keypad programming allows the user to change conventional channel parameters such as the transmit and receive frequency, Call Guard squelch code, and encryption code. In addition, several conventional mode timers can be changed. You cannot use it to reprogram disabled channels or any Project 25 Trunked, SMARTNET/SmartZone, and Multi-Net information.

This section covers the following aspects of 51xx portable keypad programming:

- Menu description
- Zone change parameter
- Channel change parameter
- System parameters
- Channel parameters

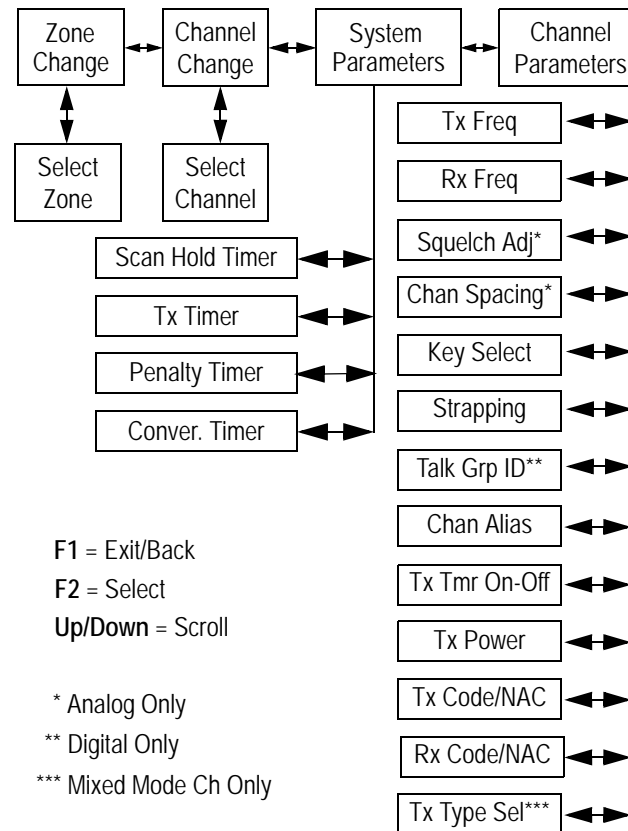
11.1 Menu Description

51xx portable keypad programming uses a menu system to let you select the parameters you want to change in the keypad programming mode. Figure 11.1 is a flowchart that shows the keypad programming mode menu structure. When you select the keypad programming mode by the **Keypad Programming** option button or menu parameter, the first menu parameter “CHNG ZONE” displays as just described. Press the Up/Down switch to scroll through the following parameters:

- CHNG ZONE (Section 11.2)
- CHNG CHAN (Section 11.3)
- SYS PARMS (Section 11.4)
- CHAN PARMS (Section 11.5)

Press the <F2> (Select) key to select a highlighted parameter, and press the <F1> key from one of the main menus to exit keypad programming. When you press the <F1> key in the other menus, you return to the previous menu. You also use the Up/Down switch in several menus to scroll through available selections. The following sections describe these parameters.

Figure 11.1 51xx Keypad Programming Menu Flowchart



11.2 Zone Change Parameter

The “CHNG ZONE” menu parameter selects the zone containing the conventional channel that you want to reprogram. It does not change the zone selected for normal operation.

Press the <F2> key to select the “ZONE CHG” parameter and then scroll through the programmed zones by pressing the Up/Down switch. When the desired zone displays, select it by pressing the <F2> key.

11.3 Channel Change Parameter

The “CHNG CHAN” menu parameter selects the conventional channel to be reprogrammed. You cannot select disabled channels or Project 25 Trunked/SMARTNET/SmartZone channels. This does not change the channel selected for normal operation.

Press the Select switch to select the “CHNG CHAN” parameter and then scroll through the programmed channels by pressing the Up/Down switch. When the desired channel appears, select it by pressing <F2> key.

11.4 System Parameters

Note *If “PASSWORD” displays briefly when you try to select one of the following parameters, you must enter the zone password before you can make any changes. Refer to Section 10.4 for more information.*

The “SYS PARMS” menu parameter lets you select the conventional mode timer that you want to reprogram from among the following. Press the <F2> key to select the “SYS PARMS” parameter, then press the Up/Down switch to display the desired parameter. Press the <F2> key again to select it.

SCAN TIMER - Selects the Scan Hold timer. Press the Up/Down switch to decrement or increment the timer in 0.5-second steps from 0-7.5 or disable it by selecting 0 seconds. When the desired value appears, store it by pressing the <F2> key.

TX TIMER - Selects the transmit time-out timer. Press the Up/Down switch to decrement or increment the timer in 15-second steps from 0-225 or disable it by selecting 0 seconds. When the desired value appears, store it by pressing the <F2> key.

PEN TIMER - Selects the penalty timer. Press the Up/Down switch to decrement or increment the timer in 15-second steps from 0-225 or disable it by selecting 0 seconds. When the desired value appears, store it by pressing the <F2> key.

CONV TIMER - Selects the conversation timer. Press the Up/Down switch to decrement or increment the timer in 30-second steps from 0-450 or disable it by selecting 0 seconds. When the desired value appears, store it by pressing the <F2> key.

11.5 Channel Parameters

Note *If “PASSWORD” displays briefly when you try to select one of the following parameters, you must enter the zone password before you can make any changes. Refer to Section 10.4 for more information.*

The “CHAN PARMS” menu parameter selects the following conventional channel parameters that you can reprogram. Press the <F2> key to select the “CHAN PARMS” parameter, then press the Up/Down switch to display the desired parameter. Next, press the <F2> key to select it. The squelch control parameters are unique to the type of conventional channel selected (analog or Project 25).

Note *If you select a mixed-mode channel, you can program both the **RX CODE** (analog) and **RX NAC** (Project 25) parameters that are described below. Also, if the **Transmit Type** is analog, a **TX CODE** is programmed. If the **Transmit Type** is Digital (Project 25), a **TX NAC** is programmed.*

TX FREQ - Programs the transmit channel frequency. The digits that you change begin to flash. Press the Up/Down switch to select the desired number for that digit. Then, press the <F2> key to move to the next digit. If you try to enter an invalid frequency, a beep sounds, “INVALID” displays briefly, and you must reenter the number.

RX FREQ - Programs the transmit frequency the same as **RX FREQ** above.

SQ ADJ (analog only) - Changes the preset squelch setting on that channel. “0” is the default setting. You can select values from –7 to +7. Increasing this setting toward +7 causes the squelch to open sooner so you can receive weaker signals. Decreasing it toward –7 causes the opposite to occur.

Note *The channel spacing is selectable on a P25 conventional digital channel if it is set to “Mixed Mode”. The channel spacing selections are the same as the analog channel spacing under this situation. You cannot change the squelch because the setting is critical for proper receiver operation.*

CHAN SPC - Selects either wide or narrow band channel spacing on analog channels only. Press the Up/Down switch to select “WIDE” or “NARROW”. When the desired setting displays, store it by pressing the <F2> key.

Note *Program the next two parameters only if the radio is programmed for encryption.*

Key Select - Selects the encryption key for the channel if applicable. The key storage location of 0-15 (PID) or 1-16 (SLN) is selected. Refer to Section 4.2. If no keys are programmed, “No Keys” appears.

Strapping - Selects the encryption strapping mode for the channel as “Clear”, “Secure”, or “Switched”.

TG ID (Project 25 Only) - Selects the talk group for the selected channel. Press the <F2> key to display the current talk group ID, then press the <F2> key again to enter a different ID from 1-65,535. You must enter this number directly using the DTMF keypad.

Channel Alias - Programs the alias for the channel (DTMF keypad models only). You can enter a maximum of ten characters. Press the <F2> key once to display the current alias, then press it again to program a new alias. You program alphanumeric characters using the 0-9 keys. Pressing a key once enters the first letter on the key, then pressing it successive times enters the letters and the number on the key. For example, press the <2> key twice to enter “B”. Press the <F2> key to move to the next position or press it twice to enter a space.

TX TIMER - Enables or disables the time-out timer on the current channel. Press the Up/Down switch to select the on and off mode. When the desired setting displays, store it by pressing the <F2> key.

TX POWER - Selects the desired power output level. Press the Up/Down switch to scroll through the following choices. When the desired setting displays, store it by pressing the <F2> key.

- Power High - High transmit power
- Power Low - Low transmit power

- **Power SW** - Switchable power selectable by the High/Low power switch. You cannot choose this if that switch is not programmed.

CTCSS/DCS Squelch Control (analog channel)

TX CODE - Programs the transmit Call Guard (CTCSS/DCS) code. The currently selected code displays. Press the Up/Down switch to select the desired code type (CTCSS analog or DCS digital). Then press the <F2> key to select it and enter the code number. This process is similar to programming a channel frequency as just described.

RX CODE - Selects the receive codes the same as **TX CODE** above.

NAC Squelch Control (Project 25 Channel)

TX NAC - Programs the transmit Network Access Code (NAC) which can be any number from 0-4095. With later models, this number appears in hexadecimal from 000-FFF. The procedure is similar to programming a **TX FREQ** as just described. If you enter an invalid code, a beep sounds, "INVALID" appears briefly, and you must reenter the code.

RX NAC - Selects the receive NAC through a similar process as described for **TX NAC** above.

Transmit Type (Project 25 mixed mode only) - If the selected channel is a mixed mode, analog and Project 25 channel, this selects the transmit type. You can select either analog or digital (Project 25). This then determines if a TX CODE or TX NAC is programmed above.

SECTION 12

53xx Mobile Keypad Programming

Note *Keypad programming is permitted for United States federal government users only. It is not permitted for any user regulated by the United States Federal Communications Commission (FCC). Refer to Section 3.3.*

Since only United States federal government users are permitted to use keypad programming, you can only program United States federal government models of this radio with this feature.

You can only use keypad programming if it has been enabled by factory programming and a conventional mode option switch or menu parameter is programmed for the **Keypad Programming** function. You then select it by simply pressing that switch. You do not need to enter a password to use it. The text “CHNG ZONE” and a triangle in the display indicate keypad programming mode as follows:



Keypad programming allows you to change conventional channel parameters such as the transmit and receive frequencies, Call Guard squelch code, and encryption key. You can use it to change several conventional mode timers. You cannot use it to reprogram disabled channels or any Project 25 Trunked, SMARTNET/SmartZone, and Multi-Net information.

This section covers the following aspects of 53xx mobile keypad programming:

- Menu description
- Zone change parameter
- Channel change parameter
- System parameters
- Channel parameters

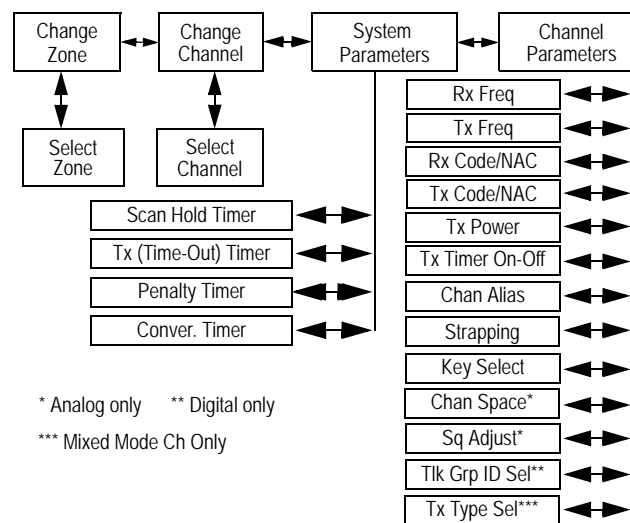
12.1 Menu Description

53xx mobile keypad programming uses a menu system to let you select the parameters you want to change in the keypad programming mode. Rotate and press the **Select** switch to scroll through and select the available parameters. The available parameters and the section in which each is described are as follows:

- CHNG ZONE (Section 12.2)
- CHNG CHAN (Section 12.3)
- SYS PARMS (Section 12.4)
- CHAN PARMS (Section 12.5)

Press the **Select** switch to select the displayed parameter. Press the **Keypad Programming** option switch from one of the main menus to exit keypad programming, or from other menus to exit back one level. Figure 12.1 shows the keypad programming mode menu structure.

Figure 12.1 53xx Keypad Programming Menu Flowchart



12.2 Zone Change Parameter

The “CHNG ZONE” menu parameter selects the zone containing the conventional channel that you want to reprogram. It does not change the zone selected for normal operation.

Press the **Select** switch to select the “CHNG ZONE” parameter, then scroll through the programmed zones by rotating that switch. When the desired zone displays, select it by pressing the **Select** switch.

12.3 Channel Change Parameter

The “CHNG CHAN” menu parameter selects the conventional channel that you want to reprogram. You cannot select disabled or Project 25 Trunked/SMARTNET/SmartZone channels. This does not change the channel selected for normal operation.

Press the **Select** switch to display “CHNG CHAN” and then rotate that switch to scroll through the programmed channels. When the desired channel displays, select it by pressing the **Select** switch.

12.4 System Parameters

Note *If “ENTER PSWD” displays briefly when you try to select one of the following parameters, you must enter the zone password before you can make any changes. Refer to Section 10.4 for more information.*

The “SYS PARMS” menu parameter selects the conventional mode timer that you want to reprogram. Press the **Select** switch to select the “SYS PARMS” parameter and then rotate that switch to display the desired parameter. Then press the **Select** switch again to select it.

SCAN TIMER - Selects the Scan Hold timer. Rotate the **Select** switch to decrement or increment the timer in 0.5-second steps from 0-7.5 or set it to 0 seconds to disabled it. When the desired value displays, store it by pressing the **Select** switch.

TX TIMER - Selects the transmit time-out timer. Rotate the **Select** switch to decrement or increment the timer in 15-second steps from 0-225 or disable it by selecting 0 seconds. When the desired value displays, store it by pressing the **Select** switch.

PEN TIMER - Selects the penalty timer. Rotate the **Select** switch to decrement or increment the timer in 15-second steps from 0-225 or disable it by selecting 0 seconds. When the desired value displays, store it by pressing the **Select** switch.

CONV TIMER - Selects the conversation timer. Rotate the **Select** switch to decrement or increment the timer in 30-second steps from 0-450 or disable it by selecting 0 seconds. When the desired value displays, store it by pressing the **Select** switch.

12.5 Channel Parameters

Note *If “ENTER PSWD” displays briefly when you try to select one of the following parameters, you must enter the zone password before you can make any changes. Refer to Section 10.4 for more information.*

The “CHAN PARMS” menu parameter selects the following conventional channel parameters that can be reprogrammed. Press **Select** switch to select the “CHAN PARMS” parameter and then rotate that switch to display the desired parameter. Then press the **Select** switch again to select it. The squelch control parameters are unique to the type of conventional channel selected (analog or Project 25).

Note *If you select a mixed mode channel, you can program either the Rx Code (analog) and Rx NAC (Project 25) which follow. Also, if the Tx Type is Analog, a Tx Code is programmed, and if it is Digital (Project 25), a Tx NAC is programmed.*

RX FREQ - Sets the receive channel frequency. To select the digit to change or move the cursor to the right, press the **Select** switch. Then to display the desired digit, rotate the **Select** switch. The frequency is stored after programming the last digit. If you enter an invalid frequency, a beep sounds, “INVALID” is displayed briefly, and the frequency editing mode continues to be selected.

TX FREQ - Selects the transmit frequency the same as RX FREQ above.

CTCSS/DCS Squelch Control (Analog Channel)

RX CODE - Sets the receive Call Guard (CTCSS/DCS) code. The currently selected code is initially displayed. If required, rotate and press the **Select** switch to select the desired type (CTCSS analog or DCS digital). Then enter the desired code similar to programming a receive frequency as just described. If an invalid code is entered, a beep sounds, “INVALID” is briefly displayed, and the editing mode continues to be selected.

TX CODE - Selects the transmit codes the same as RX CODE above.

NAC Squelch Control (Project 25 Channel)

RX NAC - Selects the receive Network Access Code (NAC) which can be any number from 0-4095. With later models, this number displays in hexadecimal from 000-FFF. Rotate and press the **Select** switch to enter the desired code. The displayed code is stored after the last digit is programmed. If you enter an invalid code, a beep sounds, “INVALID” is displayed briefly, and the NAC editing mode continues to be selected.

TX NAC - Selects the transmit NAC the same as RX NAC above.

TX POWER - Selects the desired power output level. Rotate the **Select** switch to scroll through the following choices. When the desired setting displays, store it by pressing the **Select** switch.

- **POWER HIGH** - High transmit power
- **POWER LOW** - Low transmit power
- **POWER SW** - Switchable power selectable by the High/Low power switch. This choice is not available if that switch is not programmed.

TX TIMER - Enables or disables the time-out timer on the current channel. Rotate the **Select** switch to toggle between the on and off mode, and when the desired setting displays, store it by pressing the **Select** switch.

Channel Alias - Programs the alias for the channel. Up to ten characters from A-Z and 0-9 and spaces can be entered. Press **Select** switch once to display the current alias and then press it again or rotate it to program a new alias. Rotate the **Select** switch to display the desired character and then press it to move to the next position. The number is stored after the **Select** switch is pressed with the last position selected.

Note *The next two parameters are programmed only if the radio is programmed for encryption.*

Strapping - Selects the encryption strapping mode for the channel as Clear, Secure, or Switched.

Key Select - Selects the encryption key for the channel if applicable. The key storage location of 0-15 (PID) or 1-16 (SLN) is selected. Refer to Section 4.2. If no keys are programmed, “No Keys” displays.

Note *Channel spacing is selectable on a P25 conventional digital channel if it is set to “Mixed Mode”. The channel spacing selections are the same as the analog channel spacing under this situation. You cannot change the squelch because the setting is critical for proper receiver operation.*

CHAN SPACE - Selects either wide or narrow band channel spacing on analog channels only. Rotate the **Select** switch to toggle between “WIDE” and “NARROW”, and when the desired setting displays, store it by pressing the **Select** switch.

SQ ADJUST (analog only) - Changes the preset squelch setting on that channel. The default setting is “0” and values of –7 to +7 can be selected. Increasing this setting toward +7 causes the squelch to open sooner so the radio can receive weaker signals, and decreasing it toward –7 causes the opposite to occur.

TG ID (Project 25 only) - Selects the talk group for the selected channel. Rotate the **Select** switch to display the alias of each preprogrammed talk group and then press it to store the desired talk group.

Transmit Type (Project 25 mixed mode only) - If the selected channel is a mixed mode, analog and Project 25 channel, this selects the transmit type. You can select either analog or digital (Project 25). This then determines if a Tx Code or Tx NAC is programmed above.

SECTION 13

System Key

To program certain SMARTNET/SmartZone and Project 25 Trunking parameters, PC Configure must detect the proper system key. EFJohnson provides the software system key or Enhanced System Key (MSK/SSK) functionality to *authorized users*. It is not the same as the encryption (hardware) key. You do not need it to program conventional analog and conventional Project 25 parameters.

The following sections describe the parameters that are available only with the system key. Other parameters associated with trunking, such as zones and channels, continue to be editable. If a system key has no trunking parameters enabled, a default trunking system of “One” is assigned and disabled parameters are unavailable for assignment to this system even though the radio can operate in trunking mode.

This section describes the following aspects of the system key:

- Location
- Disabled SMARTNET/SmartZone parameters
- Disabled Project 25 trunking parameters

13.1 Software System Key Location

Copy the software system key to the *Keys* folder of the directory. This folder is automatically created when you install. The default directory in which is installed is as follows; some other location may also have been selected:

Program Files\EF Johnson\PCConfigure2_x_x.

You can also load the system key from other folders using the **Radio → Load System Keys** function. A dialog box appears that allows you to select the folder. Once you designate the folder, the keys are available. Either the *Keys* folder or a previously designated folder is selected, depending on the **Tools → Preferences** programming. Refer to Section 3.4.



- The key icon on the system screen (Figure 6.2) indicates that a system key is present in this folder. If a system key is not present, this yellow key icon has a red “X” over it as shown above and you cannot program any of the following parameters. In addition, be sure to select the proper system ID contained in the key in the **IDs → System** drop-down list on the **Per System** screen.

13.2 Using the Enhanced System Key

PC Configure uses a system key to protect system parameters from being edited by unauthorized personnel. Refer to Section 6.2 for the items protected in SMARTNET/SmartZone and Section 7.2 for items protected in P25 Trunking Systems. A radio programmer can edit/customize the alias, group scan list and function buttons, etc. without the need for a system key, but is prohibited from editing protected fields without the system key. PC Configure supports the use of a “hard” system key file and the Enhanced Key functionality which allows a user with a Master System key to enable Slave keys, tied to specific parameters that will let a secondary user program the designated system fields.

Figure 13.1 Enhanced System Key



Each Master System Key (MSK) can be programmed for up to four system keys with full access to all PC Configure features. With the MSK, the system administrator can generate and track Slave Keys (SSK) issued. The SSK offers authorized organizations limited access to PC Configure programming. For each System Key, the Slave Key can be programmed for access to a limited range for both Unit IDs (a maximum three ranges) and Talkgroups (maximum five ranges).

To create a Slave System Key using a Master System Key:

Note *This procedure assumes possession of a formatted Slave System key, and a finished Master System Key to be used as a source Key. System Master keys and blank formatted Slave keys are available from EF Johnson.*

- 1 Insert the Master System Key and the Slave System Key to be programmed into USB ports.

Note *EFJohnson USB master keys are Part No. 250-5000-971. Your organization may also distribute them on slave keys (Part No. 250-5000-973).*

- 2 Under PC Configure, open the **Tools** menu and select **Edit Key Devices**.

Figure 13.2 Key Devices Screen

The screenshot shows the 'Key Devices' window with two main sections: 'Master Key Device' on the left and 'Slave Key Device' on the right. The Master section shows a 'Master Key Device' with 'Serial #: 1' and a list of 'System IDs' (2, 3, 4, 5) with 'Type: P25 Trunking' and 'WACN ID: 20'. The Slave section shows a 'Slave Key Device' with 'Serial #: 0', 'Exp. Date: 6/30/2006', and 'Created By: N/A'. It also has a 'System IDs' list and 'Type: P25 Trunking' with 'WACN ID: 20'. Below the System IDs lists are 'Unit ID Ranges' and 'Group ID Ranges' tables. The 'Unit ID Ranges' table has columns 'Lower' and 'Upper' with rows 1 (12, 15), 2 (0, 0), and 3 (0, 0). The 'Group ID Ranges' table has columns 'Lower' and 'Upper' with rows 1 (1, 5), 2 (0, 0), 3 (0, 0), 4 (0, 0), and 5 (0, 0). Navigation buttons (>, >>, <, <<) are between the sections. At the bottom are 'Read', 'Read As Master', 'Write', and 'Read' buttons, and a 'Close' button.

The Key Devices screen shows the System IDs that are programmed on the Master System Key. These are located on the left side of the window. The Key icon in the upper portion of both the Master Key device and the Slave Key device indicates the present of the respective key: The screen above shows the presence of a Master Key device (note the yellow key icon near the top of the left side of the screen), but not a Slave Key device (note a red “X” through the yellow key icon on the right side of the screen. The presence of the red X indicates that PC Configure does not detect a key.) To continue, ensure that both a Master Key and Slave Key device are detected.

- 3 Select the System IDs to be sent to the Slave System Key by highlighting each ID, one at a time, and clicking the > button between the Master and Slave sides of the window. If you wish to include all available system IDs, this can be done by clicking the >> button.
- 4 Once all desired System IDs have been sent to the Slave side of the window, select the first System ID on the Slave side list, and enter at least one range of Unit IDs and one range of Group IDs.

Note Unit and Group IDs can be entered in Hexidecimal/Decimal format.

- 5 After entering Unit ID and Group ID ranges, select the next System ID on the Slave list, (if entering more than one) and repeat the process. Do this for each System ID being programmed.

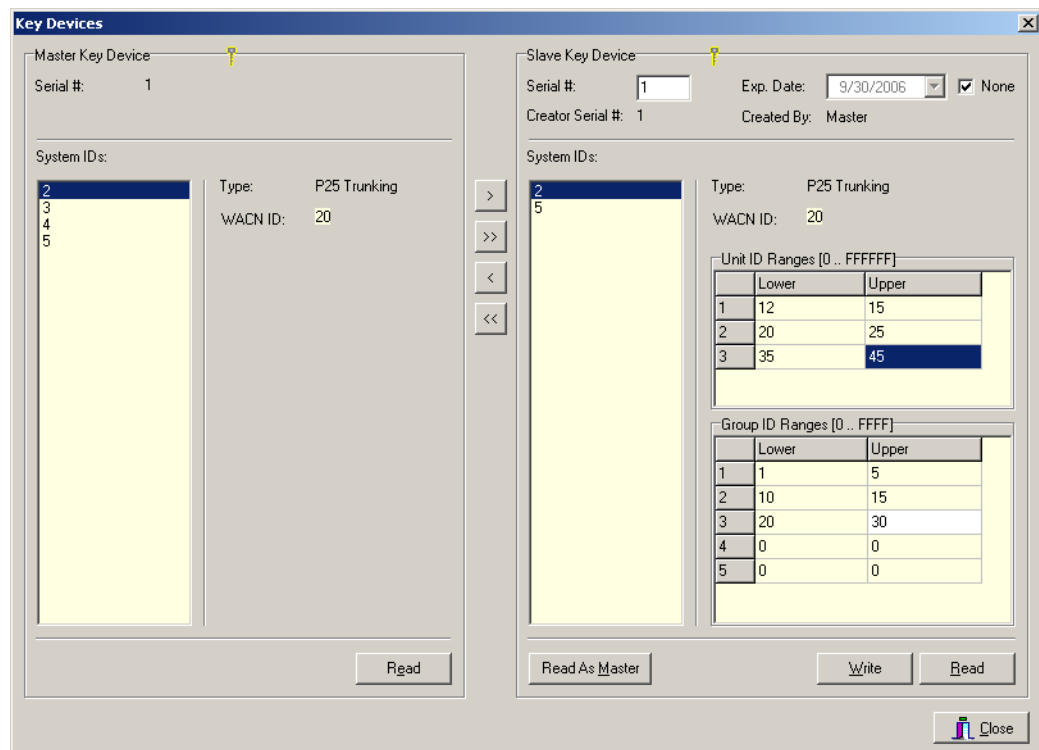
- 6 If you wish to assign an expiration date to the Slave System Key, uncheck the **None** box in the expiration date section of the Slave side of the window. This allows you to enter an expiration date. Click the down arrow next to the **Exp. Date** field to display a calendar.



If you do *not* wish to assign an expiration date to the Slave System Key, leave the **None** box checked.

- 7 Assign a serial number to the Slave System Key (any number from 1 to 32767).

Figure 13.3 Key Devices Screen (with Activated Slave Key)



- 8 Click the **Write** button on the Slave key side of the window, and the new Slave System Key is created.

13.3 ePlug Functionality

The ePlug functionality allows you to assign ESNs to specific files for downloading to the radio with the matching ESN without a system key. Please refer to Section 2 in for more information about the ePlug functionality.

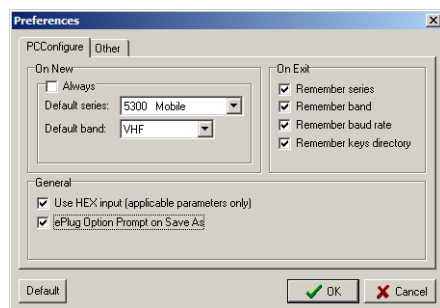
When setting up or reprogramming an individual radio, an EFJohnson standard trunking code plug with the addition of an EFJohnson Electronic Serial Number (ESN) may be used. ePlug features include:

- Using PC Configure, the System Programmer has the ability to enter/edit an EFJ ESN number to the standard programming template (code plug). *For Trunking files, a valid system key must be present (either soft or Enhanced System Key) to enter or edit an EFJ ESN.*
- Using PC Configure, a radio programmer can load an ePlug into a radio with the matching ESN without the need for a system key.
- The radio programmer can edit any of the non-prohibited fields of the ePlug to customize the alias, group scan list, and function buttons etc.
- The radio programmer is prohibited from editing any of the protected fields of the ePlug unless a system key is present.

To implement in PC Configure:

- 1 In PC Configure, select the **ePlug Option Prompt on Save As** field on the **Tools → Preferences → PCConfigure** screen.

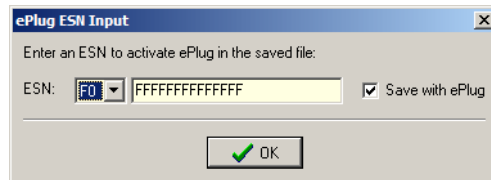
Figure 13.4 Preferences Screen



- 2 Change the Unit ID to the radio into which this file will be going.
- 3 Save the file, performing a “Save As”. Enter the file name as you want it to be saved.

The following dialog box is displayed.

Figure 13.5 ESN Input



- 4 Press **OK** to save the file using the ESN of the connected radio.

A current or archived file can be saved by entering the ESN of the radio for which the file is being saved, and clicking **OK**. This can be found in PC Configure under **Transfer → Read Version Info from Radio**.

- 5 Use the **Radio → Series** menu to select the correct radio type (for example, 53xx mobile or 51xx portable). Refer to Section 3.2.
- 6 Connect the radio to which this file will be transferred.
- 7 Open PC Configure and select the file that was saved.
- 8 Download to the different radio without the system key present.

*Some operating protocols and options may not be available with your radio. To display the options that have been factory-enabled for your radio, select **Transfer → Read Options From Radio**. Refer to Section 3.3.*

13.4 Disabled SMARTNET/SmartZone Parameters

You cannot add or delete the following SMARTNET/SmartZone parameters without the proper system key:

- System ID - You can only select the system IDs from available keys
- Individual ID
- Control channels
- Talk groups
- Announcement groups
- Emergency groups
- Connect tone
- Splinter channel option

13.5 Disabled Project 25 Trunking Parameters

The following Project 25 Trunked parameters cannot be added or deleted without the proper system key. You can still edit conventional analog and Project 25 parameters

- WACN ID
- Home system ID
- Site ID
- RFSS ID
- Individual ID
- Control channels
- Talk groups
- Announcement groups
- Channel ID table
- Emergency Groups

SECTION 14

51xx Cloning Procedure

After an introduction to 51xx Series cloning, this section describes PC Configure's wireless cloning feature and tells how to perform cloning.

The cloning feature enables one radio to program another with identical information. You do not need PC Configure programming software to do this. This feature is available with 51xx portables only. Other requirements are as follows:

- You must enable the Clone menu parameter in the master (sending) radio. The slave (receiving) radio does not need this parameter.
- The master and slave radios must be identical models (same frequency range and options).

You can only transfer zones with conventional analog and Project 25 channels using this function. This function will not transfer any SMARTNET/SmartZone or Project 25 trunked information. Also, this function does not transfer Project 25 Unit ID, encryption keys, or the RSI ID or other OTAR information. The slave radio indicates cloned zones by an asterisk in the first character position of the zone alias. The first character is replaced by this asterisk.

14.1 Wireless Cloning

A wireless cloning feature is available that allows one radio to program another using an RF link instead of having to be connected by a cloning cable.

The wireless cloning feature uses the Project 25 data functionality of the radio. Therefore, you must program a conventional Project 25 channel in both radios. You must program the slave radio with a Project 25 Unit ID. You must also enable Data Registration on Page 2 of the **Per System** screen. If it is not enabled, "Disabled" is displayed. Radios with wireless cloning capability have a selection in the cloning menu to select either **Clone N** (Normal) or **Clone W** (Wireless). If you select "Wireless," an additional menu appears. In

this menu, you enter the Project 25 Unit ID of the slave radio. You then select the Zone/Complete mode.

14.2 Cloning Procedure

- 1 With normal (non-wireless) cloning, connect the master radio to the slave radio using Cloning Cable, Part No. 023-5100-930.
- 2 On the master radio, select the **Clone** menu parameter and press the <F2> key. If applicable, select either **Clone W** (Wireless) or **Clone N** (Normal). If you select normal cloning or if you cannot select either, proceed to Step 4.
- 3 With wireless cloning, a screen appears for entering the Project 25 Unit ID of the slave radio. Enter this ID using the keypad (or the Up/Down keys) and the <F2> key.
- 4 Select the **Zone** or **Complete** clone mode as desired. Operation in these modes is as follows:

Zone - This mode allows you to transfer only channel information for the selected zone. Information programmed on the **Global**, **Radio Wide**, and **By System** screens does not change. A list of the current conventional zones appears. Select the desired zone by highlighting it and pressing the <F2> key. A selected zone is indicated by an asterisk (*). Scroll to **OK** and press the <F2> key to begin the data transfer. This overwrites the selected zone in the slave radio. Previously, you could select multiple zones. They were appended to those in the slave radio.

Complete - This mode transfers all conventional programming information. This includes information on the **Global**, **Radio Wide**, and **By System** screens. Simply highlight **Complete** and press the <F2> key to begin the data transfer. This mode overwrites all this information currently in the slave radio. The radio does not retain any of the previous information except for the IDs as described in this section.

SECTION 15

Anti-Cloning Features

Note *The following information refers to copying parameters from one radio to another using the PC Configure software. It does not refer to cloning using two radios described in Section 14.*

The 51xx and 53xx radios and PC Configure software include safeguards to prevent unauthorized cloning of radios programmed for trunked operation using the PC Configure software. The trunked operating modes are SMARTNET, SmartZone, and Project 25 Trunking.

Many trunking parameters are restricted. You can program and edit them only with the correct system key as described in Section 13. These new safeguards prevent anyone from cloning another radio with restricted trunking information unless they have the correct system key.

15.1 Saving a New File/ePlug Functionality

If you save any file to disk, you must associate it with a specific radio. Therefore, when you save a new file for the first time, you must connect the radio to the computer so the ESN and other information can be read and stored with the file. However, you can open and edit a previously-saved disk file and then save it to disk again without a radio connected or without a system key.

The ePlug functionality allows you to assign ESNs to specific files for downloading to the radio with the matching ESN without a system key. Please refer to Section 13.3 for more information about the ePlug functionality.

15.2 Writing a File To Radios

Correct System Key Available - If you have a system key, you can edit a file with trunking parameters and write it to any radio.

Correct System Key Not Available - If you do not have a system key, you cannot change restricted trunking parameters. Refer to Section 13. However, you can still change non-restricted trunking and conventional parameters. You can only write the revised file to the radio with the matching ESN. If you try to write it to a different radio, an error message is displayed and download is halted.

File Containing Only Conventional Parameters (Project 25 or Analog) - There are no editing restrictions. You can write data files to any radio.

SECTION 16

Call Guard (CTCSS/DCS) and 800 MHz Channel Tables

Table 16.1 lists tone-based Call Guard tones and their associated frequencies. Table 16.2 lists digital Call Guard codes.

Table 16.1 Recommended Tone Call Guard Codes

Code	Freq	Code	Freq	Code	Freq	Code	Freq	Code	Freq
		09	91.5	18	123.0	27	167.9	36*	233.6
01	67.0	10	94.8	19	127.3	28	173.8	37*	241.8
02	71.9	11**	97.4	20	131.8	29	179.9	38*	250.3
03	74.4	12	100.0	21	136.5	30	186.2	39**	69.3
04	77.0	13	103.5	22	141.3	31	192.8	40**	206.5
05	79.7	14	107.2	23	146.2	32	203.5	41**	229.1
06	82.5	15	110.9	24	151.4	33	210.7	42**	254.1
07	85.4	16	114.8	25	156.7	34*	218.1		
08	88.5	17	118.8	26	162.2	35*	225.7		
* These tones normally are not used because of their close proximity to the voice frequencies.									
** These tones normally are not used because they may cause interference with adjacent tones.									

Table 16.2 Recommended Digital Call Guard Codes

023	065	131	172	261	346	431	532	654	743
025	071	132	174	263	351	432	546	662	754
026	072	134	205	265	364	445	565	664	
031	073	143	223	271	365	464	606	703	
032	074	152	226	306	371	465	612	712	
043	114	155	243	311	411	466	624	723	
047	115	156	244	315	412	503	627	731	
051	116	162	245	331	413	506	631	732	
054	125	165	251	343	423	516	632	734	

SECTION 17

Project 25 Packet Data Mode

Project 25 packet data transmissions are available with 5100 portable and 5300 mobile radios. A Project 25 Packet Data option button or menu parameter (5100 only) toggles the data mode.

The Project 25 packet data mode allows a radio to act as a packet data modem for a remote application connected to the subscriber unit through an RS-232 or Serial Line Internet Protocol (SLIP) connection. The SLIP connection requires an Ethernet port which is available with the 5300 mobile radio.

17.1 Hardware Required

The 5100 Series portable radio connects to the external data equipment with the standard PC Configure programming cable through the RS-232 port (female DB9 connector).

The 5300 Series mobile radio must have a special data pigtail cable installed in it. Two types of cable are available. The RS-232 cable (Part No. 597-2002-282) has a female DB9 connector for connecting the external equipment. An Ethernet data cable (part number to be assigned) is also available.

SECTION 18

FCC Channel Tables

This section provides tables listing the U. S. Federal Communications Commission's (FCC's) channels and the receive and transmit frequencies for both 800MHz and 900MHz channels and for rebanded channels. lists the FCC's 800 MHz channels and each channel's associated receive frequency (RX Freq) and transmit frequency (TX Freq). Tables 18.3 through 18.8 lists the rebanded channels and each channels associated reference numbers and frequencies.

Table 18.1 800 MHz Channels

Program Channel	FCC Channel	RX Freq	TX Freq
1	1	851.0125	806.0125
2	2	851.0375	806.0375
3	3	851.0625	806.0625
4	4	851.0875	806.0875
5	5	851.1125	806.1125
6	6	851.1375	806.1375
7	7	851.1625	806.1625
8	8	851.1875	806.1875
9	9	851.2125	806.2125
10	10	851.2375	806.2375
11	11	851.2625	806.2625
12	12	851.2875	806.2875
13	13	851.3125	806.3125
14	14	851.3375	806.3375
15	15	851.3625	806.3625
16	16	851.3875	806.3875
17	17	851.4125	806.4125
18	18	851.4375	806.4375
19	19	851.4625	806.4625
20	20	851.4875	806.4875
21	21	851.5125	806.5125

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
22	22	851.5375	806.5375
23	23	851.5625	806.5625
24	24	851.5875	806.5875
25	25	851.6125	806.6125
26	26	851.6375	806.6375
27	27	851.6625	806.6625
28	28	851.6875	806.6875
29	29	851.7125	806.7125
30	30	851.7375	806.7375
31	31	851.7625	806.7625
32	32	851.7875	806.7875
33	33	851.8125	806.8125
34	34	851.8375	806.8375
35	35	851.8625	806.8625
36	36	851.8875	806.8875
37	37	851.9125	806.9125
38	38	851.9375	806.9375
39	39	851.9625	806.9625
40	40	851.9875	806.9875
41	41	852.0125	807.0125
42	42	852.0375	807.0375
43	43	852.0625	807.0625
44	44	852.0875	807.0875
45	45	852.1125	807.1125
46	46	852.1375	807.1375
47	47	852.1625	807.1625
48	48	852.1875	807.1875
49	49	852.2125	807.2125
50	50	852.2375	807.2375
51	51	852.2625	807.2625
52	52	852.2875	807.2875
53	53	852.3125	807.3125
54	54	852.3375	807.3375
55	55	852.3625	807.3625
56	56	852.3875	807.3875
57	57	852.4125	807.4125
58	58	852.4375	807.4375
59	59	852.4625	807.4625
60	60	852.4875	807.4875
61	61	852.5125	807.5125
62	62	852.5375	807.5375

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
63	63	852.5625	807.5625
64	64	852.5875	807.5875
65	65	852.6125	807.6125
66	66	852.6375	807.6375
67	67	852.6625	807.6625
68	68	852.6875	807.6875
69	69	852.7125	807.7125
70	70	852.7375	807.7375
71	71	852.7625	807.7625
72	72	852.7875	807.7875
73	73	852.8125	807.8125
74	74	852.8375	807.8375
75	75	852.8625	807.8625
76	76	852.8875	807.8875
77	77	852.9125	807.9125
78	78	852.9375	807.9375
79	79	852.9625	807.9625
80	80	852.9875	807.9875
81	81	853.0125	808.0125
82	82	853.0375	808.0375
83	83	853.0625	808.0625
84	84	853.0875	808.0875
85	85	853.1125	808.1125
86	86	853.1375	808.1375
87	87	853.1625	808.1625
88	88	853.1875	808.1875
89	89	853.2125	808.2125
90	90	853.2375	808.2375
91	91	853.2625	808.2625
92	92	853.2875	808.2875
93	93	853.3125	808.3125
94	94	853.3375	808.3375
95	95	853.3625	808.3625
96	96	853.3875	808.3875
97	97	853.4125	808.4125
98	98	853.4375	808.4375
99	99	853.4625	808.4625
100	100	853.4875	808.4875
101	101	853.5125	808.5125
102	102	853.5375	808.5375
103	103	853.5625	808.5625

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
104	104	853.5875	808.5875
105	105	853.6125	808.6125
106	106	853.6375	808.6375
107	107	853.6625	808.6625
108	108	853.6875	808.6875
109	109	853.7125	808.7125
110	110	853.7375	808.7375
111	111	853.7625	808.7625
112	112	853.7875	808.7875
113	113	853.8125	808.8125
114	114	853.8375	808.8375
115	115	853.8625	808.8625
116	116	853.8875	808.8875
117	117	853.9125	808.9125
118	118	853.9375	808.9375
119	119	853.9625	808.9625
120	120	853.9875	808.9875
121	121	854.0125	809.0125
122	122	854.0375	809.0375
123	123	854.0625	809.0625
124	124	854.0875	809.0875
125	125	854.1125	809.1125
126	126	854.1375	809.1375
127	127	854.1625	809.1625
128	128	854.1875	809.1875
129	129	854.2125	809.2125
130	130	854.2375	809.2375
131	131	854.2625	809.2625
132	132	854.2875	809.2875
133	133	854.3125	809.3125
134	134	854.3375	809.3375
135	135	854.3625	809.3625
136	136	854.3875	809.3875
137	137	854.4125	809.4125
138	138	854.4375	809.4375
139	139	854.4625	809.4625
140	140	854.4875	809.4875
141	141	854.5125	809.5125
142	142	854.5375	809.5375
143	143	854.5625	809.5625
144	144	854.5875	809.5875

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
145	145	854.6125	809.6125
146	146	854.6375	809.6375
147	147	854.6625	809.6625
148	148	854.6875	809.6875
149	149	854.7125	809.7125
150	150	854.7375	809.7375
151	151	854.7625	809.7625
152	152	854.7875	809.7875
153	153	854.8125	809.8125
154	154	854.8375	809.8375
155	155	854.8625	809.8625
156	156	854.8875	809.8875
157	157	854.9125	809.9125
158	158	854.9375	809.9375
159	159	854.9625	809.9625
160	160	854.9875	809.9875
161	161	855.0125	810.0125
162	162	855.0375	810.0375
163	163	855.0625	810.0625
164	164	855.0875	810.0875
165	165	855.1125	810.1125
166	166	855.1375	810.1375
167	167	855.1625	810.1625
168	168	855.1875	810.1875
169	169	855.2125	810.2125
170	170	855.2375	810.2375
171	171	855.2625	810.2625
172	172	855.2875	810.2875
173	173	855.3125	810.3125
174	174	855.3375	810.3375
175	175	855.3625	810.3625
176	176	855.3875	810.3875
177	177	855.4125	810.4125
178	178	855.4375	810.4375
179	179	855.4625	810.4625
180	180	855.4875	810.4875
181	181	855.5125	810.5125
182	182	855.5375	810.5375
183	183	855.5625	810.5625
184	184	855.5875	810.5875
185	185	855.6125	810.6125

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
186	186	855.6375	810.6375
187	187	855.6625	810.6625
188	188	855.6875	810.6875
189	189	855.7125	810.7125
190	190	855.7375	810.7375
191	191	855.7625	810.7625
192	192	855.7875	810.7875
193	193	855.8125	810.8125
194	194	855.8375	810.8375
195	195	855.8625	810.8625
196	196	855.8875	810.8875
197	197	855.9125	810.9125
198	198	855.9375	810.9375
199	199	855.9625	810.9625
200	200	855.9875	810.9875
201	201	856.0125	811.0125
202	202	856.0375	811.0375
203	203	856.0625	811.0625
204	204	856.0875	811.0875
205	205	856.1125	811.1125
206	206	856.1375	811.1375
207	207	856.1625	811.1625
208	208	856.1875	811.1875
209	209	856.2125	811.2125
210	210	856.2375	811.2375
211	211	856.2625	811.2625
212	212	856.2875	811.2875
213	213	856.3125	811.3125
214	214	856.3375	811.3375
215	215	856.3625	811.3625
216	216	856.3875	811.3875
217	217	856.4125	811.4125
218	218	856.4375	811.4375
219	219	856.4625	811.4625
220	220	856.4875	811.4875
221	221	856.5125	811.5125
222	222	856.5375	811.5375
223	223	856.5625	811.5625
224	224	856.5875	811.5875
225	225	856.6125	811.6125
226	226	856.6375	811.6375

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
227	227	856.6625	811.6625
228	228	856.6875	811.6875
229	229	856.7125	811.7125
230	230	856.7375	811.7375
231	231	856.7625	811.7625
232	232	856.7875	811.7875
233	233	856.8125	811.8125
234	234	856.8375	811.8375
235	235	856.8625	811.8625
236	236	856.8875	811.8875
237	237	856.9125	811.9125
238	238	856.9375	811.9375
239	239	856.9625	811.9625
240	240	856.9875	811.9875
241	241	857.0125	812.0125
242	242	857.0375	812.0375
243	243	857.0625	812.0625
244	244	857.0875	812.0875
245	245	857.1125	812.1125
246	246	857.1375	812.1375
247	247	857.1625	812.1625
248	248	857.1875	812.1875
249	249	857.2125	812.2125
250	250	857.2375	812.2375
251	251	857.2625	812.2625
252	252	857.2875	812.2875
253	253	857.3125	812.3125
254	254	857.3375	812.3375
255	255	857.3625	812.3625
256	256	857.3875	812.3875
257	257	857.4125	812.4125
258	258	857.4375	812.4375
259	259	857.4625	812.4625
260	260	857.4875	812.4875
261	261	857.5125	812.5125
262	262	857.5375	812.5375
263	263	857.5625	812.5625
264	264	857.5875	812.5875
265	265	857.6125	812.6125
266	266	857.6375	812.6375
267	267	857.6625	812.6625

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
268	268	857.6875	812.6875
269	269	857.7125	812.7125
270	270	857.7375	812.7375
271	271	857.7625	812.7625
272	272	857.7875	812.7875
273	273	857.8125	812.8125
274	274	857.8375	812.8375
275	275	857.8625	812.8625
276	276	857.8875	812.8875
277	277	857.9125	812.9125
278	278	857.9375	812.9375
279	279	857.9625	812.9625
280	280	857.9875	812.9875
281	281	858.0125	813.0125
282	282	858.0375	813.0375
283	283	858.0625	813.0625
284	284	858.0875	813.0875
285	285	858.1125	813.1125
286	286	858.1375	813.1375
287	287	858.1625	813.1625
288	288	858.1875	813.1875
289	289	858.2125	813.2125
290	290	858.2375	813.2375
291	291	858.2625	813.2625
292	292	858.2875	813.2875
293	293	858.3125	813.3125
294	294	858.3375	813.3375
295	295	858.3625	813.3625
296	296	858.3875	813.3875
297	297	858.4125	813.4125
298	298	858.4375	813.4375
299	299	858.4625	813.4625
300	300	858.4875	813.4875
301	301	858.5125	813.5125
302	302	858.5375	813.5375
303	303	858.5625	813.5625
304	304	858.5875	813.5875
305	305	858.6125	813.6125
306	306	858.6375	813.6375
307	307	858.6625	813.6625
308	308	858.6875	813.6875

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
309	309	858.7125	813.7125
310	310	858.7375	813.7375
311	311	858.7625	813.7625
312	312	858.7875	813.7875
313	313	858.8125	813.8125
314	314	858.8375	813.8375
315	315	858.8625	813.8625
316	316	858.8875	813.8875
317	317	858.9125	813.9125
318	318	858.9375	813.9375
319	319	858.9625	813.9625
320	320	858.9875	813.9875
321	321	859.0125	814.0125
322	322	859.0375	814.0375
323	323	859.0625	814.0625
324	324	859.0875	814.0875
325	325	859.1125	814.1125
326	326	859.1375	814.1375
327	327	859.1625	814.1625
328	328	859.1875	814.1875
329	329	859.2125	814.2125
330	330	859.2375	814.2375
331	331	859.2625	814.2625
332	332	859.2875	814.2875
333	333	859.3125	814.3125
334	334	859.3375	814.3375
335	335	859.3625	814.3625
336	336	859.3875	814.3875
337	337	859.4125	814.4125
338	338	859.4375	814.4375
339	339	859.4625	814.4625
340	340	859.4875	814.4875
341	341	859.5125	814.5125
342	342	859.5375	814.5375
343	343	859.5625	814.5625
344	344	859.5875	814.5875
345	345	859.6125	814.6125
346	346	859.6375	814.6375
347	347	859.6625	814.6625
348	348	859.6875	814.6875
349	349	859.7125	814.7125

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
350	350	859.7375	814.7375
351	351	859.7625	814.7625
352	352	859.7875	814.7875
353	353	859.8125	814.8125
354	354	859.8375	814.8375
355	355	859.8625	814.8625
356	356	859.8875	814.8875
357	357	859.9125	814.9125
358	358	859.9375	814.9375
359	359	859.9625	814.9625
360	360	859.9875	814.9875
361	361	860.0125	815.0125
362	362	860.0375	815.0375
363	363	860.0625	815.0625
364	364	860.0875	815.0875
365	365	860.1125	815.1125
366	366	860.1375	815.1375
367	367	860.1625	815.1625
368	368	860.1875	815.1875
369	369	860.2125	815.2125
370	370	860.2375	815.2375
371	371	860.2625	815.2625
372	372	860.2875	815.2875
373	373	860.3125	815.3125
374	374	860.3375	815.3375
375	375	860.3625	815.3625
376	376	860.3875	815.3875
377	377	860.4125	815.4125
378	378	860.4375	815.4375
379	379	860.4625	815.4625
380	380	860.4875	815.4875
381	381	860.5125	815.5125
382	382	860.5375	815.5375
383	383	860.5625	815.5625
384	384	860.5875	815.5875
385	385	860.6125	815.6125
386	386	860.6375	815.6375
387	387	860.6625	815.6625
388	388	860.6875	815.6875
389	389	860.7125	815.7125
390	390	860.7375	815.7375

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
391	391	860.7625	815.7625
392	392	860.7875	815.7875
393	393	860.8125	815.8125
394	394	860.8375	815.8375
395	395	860.8625	815.8625
396	396	860.8875	815.8875
397	397	860.9125	815.9125
398	398	860.9375	815.9375
399	399	860.9625	815.9625
400	400	860.9875	815.9875
401	401	861.0125	816.0125
402	402	861.0375	816.0375
403	403	861.0625	816.0625
404	404	861.0875	816.0875
405	405	861.1125	816.1125
406	406	861.1375	816.1375
407	407	861.1625	816.1625
408	408	861.1875	816.1875
409	409	861.2125	816.2125
410	410	861.2375	816.2375
411	411	861.2625	816.2625
412	412	861.2875	816.2875
413	413	861.3125	816.3125
414	414	861.3375	816.3375
415	415	861.3625	816.3625
416	416	861.3875	816.3875
417	417	861.4125	816.4125
418	418	861.4375	816.4375
419	419	861.4625	816.4625
420	420	861.4875	816.4875
421	421	861.5125	816.5125
422	422	861.5375	816.5375
423	423	861.5625	816.5625
424	424	861.5875	816.5875
425	425	861.6125	816.6125
426	426	861.6375	816.6375
427	427	861.6625	816.6625
428	428	861.6875	816.6875
429	429	861.7125	816.7125
430	430	861.7375	816.7375
431	431	861.7625	816.7625

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
432	432	861.7875	816.7875
433	433	861.8125	816.8125
434	434	861.8375	816.8375
435	435	861.8625	816.8625
436	436	861.8875	816.8875
437	437	861.9125	816.9125
438	438	861.9375	816.9375
439	439	861.9625	816.9625
440	440	861.9875	816.9875
441	441	862.0125	817.0125
442	442	862.0375	817.0375
443	443	862.0625	817.0625
444	444	862.0875	817.0875
445	445	862.1125	817.1125
446	446	862.1375	817.1375
447	447	862.1625	817.1625
448	448	862.1875	817.1875
449	449	862.2125	817.2125
450	450	862.2375	817.2375
451	451	862.2625	817.2625
452	452	862.2875	817.2875
453	453	862.3125	817.3125
454	454	862.3375	817.3375
455	455	862.3625	817.3625
456	456	862.3875	817.3875
457	457	862.4125	817.4125
458	458	862.4375	817.4375
459	459	862.4625	817.4625
460	460	862.4875	817.4875
461	461	862.5125	817.5125
462	462	862.5375	817.5375
463	463	862.5625	817.5625
464	464	862.5875	817.5875
465	465	862.6125	817.6125
466	466	862.6375	817.6375
467	467	862.6625	817.6625
468	468	862.6875	817.6875
469	469	862.7125	817.7125
470	470	862.7375	817.7375
471	471	862.7625	817.7625
472	472	862.7875	817.7875

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
473	473	862.8125	817.8125
474	474	862.8375	817.8375
475	475	862.8625	817.8625
476	476	862.8875	817.8875
477	477	862.9125	817.9125
478	478	862.9375	817.9375
479	479	862.9625	817.9625
480	480	862.9875	817.9875
481	481	863.0125	818.0125
482	482	863.0375	818.0375
483	483	863.0625	818.0625
484	484	863.0875	818.0875
485	485	863.1125	818.1125
486	486	863.1375	818.1375
487	487	863.1625	818.1625
488	488	863.1875	818.1875
489	489	863.2125	818.2125
490	490	863.2375	818.2375
491	491	863.2625	818.2625
492	492	863.2875	818.2875
493	493	863.3125	818.3125
494	494	863.3375	818.3375
495	495	863.3625	818.3625
496	496	863.3875	818.3875
497	497	863.4125	818.4125
498	498	863.4375	818.4375
499	499	863.4625	818.4625
500	500	863.4875	818.4875
501	501	863.5125	818.5125
502	502	863.5375	818.5375
503	503	863.5625	818.5625
504	504	863.5875	818.5875
505	505	863.6125	818.6125
506	506	863.6375	818.6375
507	507	863.6625	818.6625
508	508	863.6875	818.6875
509	509	863.7125	818.7125
510	510	863.7375	818.7375
511	511	863.7625	818.7625
512	512	863.7875	818.7875
513	513	863.8125	818.8125

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
514	514	863.8375	818.8375
515	515	863.8625	818.8625
516	516	863.8875	818.8875
517	517	863.9125	818.9125
518	518	863.9375	818.9375
519	519	863.9625	818.9625
520	520	863.9875	818.9875
521	521	864.0125	819.0125
522	522	864.0375	819.0375
523	523	864.0625	819.0625
524	524	864.0875	819.0875
525	525	864.1125	819.1125
526	526	864.1375	819.1375
527	527	864.1625	819.1625
528	528	864.1875	819.1875
529	529	864.2125	819.2125
530	530	864.2375	819.2375
531	531	864.2625	819.2625
532	532	864.2875	819.2875
533	533	864.3125	819.3125
534	534	864.3375	819.3375
535	535	864.3625	819.3625
536	536	864.3875	819.3875
537	537	864.4125	819.4125
538	538	864.4375	819.4375
539	539	864.4625	819.4625
540	540	864.4875	819.4875
541	541	864.5125	819.5125
542	542	864.5375	819.5375
543	543	864.5625	819.5625
544	544	864.5875	819.5875
545	545	864.6125	819.6125
546	546	864.6375	819.6375
547	547	864.6625	819.6625
548	548	864.6875	819.6875
549	549	864.7125	819.7125
550	550	864.7375	819.7375
551	551	864.7625	819.7625
552	552	864.7875	819.7875
553	553	864.8125	819.8125
554	554	864.8375	819.8375

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
555	555	864.8625	819.8625
556	556	864.8875	819.8875
557	557	864.9125	819.9125
558	558	864.9375	819.9375
559	559	864.9625	819.9625
560	560	864.9875	819.9875
561	561	865.0125	820.0125
562	562	865.0375	820.0375
563	563	865.0625	820.0625
564	564	865.0875	820.0875
565	565	865.1125	820.1125
566	566	865.1375	820.1375
567	567	865.1625	820.1625
568	568	865.1875	820.1875
569	569	865.2125	820.2125
570	570	865.2375	820.2375
571	571	865.2625	820.2625
572	572	865.2875	820.2875
573	573	865.3125	820.3125
574	574	865.3375	820.3375
575	575	865.3625	820.3625
576	576	865.3875	820.3875
577	577	865.4125	820.4125
578	578	865.4375	820.4375
579	579	865.4625	820.4625
580	580	865.4875	820.4875
581	581	865.5125	820.5125
582	582	865.5375	820.5375
583	583	865.5625	820.5625
584	584	865.5875	820.5875
585	585	865.6125	820.6125
586	586	865.6375	820.6375
587	587	865.6625	820.6625
588	588	865.6875	820.6875
589	589	865.7125	820.7125
590	590	865.7375	820.7375
591	591	865.7625	820.7625
592	592	865.7875	820.7875
593	593	865.8125	820.8125
594	594	865.8375	820.8375
595	595	865.8625	820.8625

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
596	596	865.8875	820.8875
597	597	865.9125	820.9125
598	598	865.9375	820.9375
599	599	865.9625	820.9625
600	600	865.9875	820.9875
601	-	866.0000	821.0000
602	601	866.0125	821.0125
603	-	866.0250	821.0250
604	602	866.0375	821.0375
605	603	866.0500	821.0500
606	604	866.0625	821.0625
607	605	866.0750	821.0750
608	606	866.0875	821.0875
609	607	866.1000	821.1000
610	608	866.1125	821.1125
611	609	866.1250	821.1250
612	610	866.1375	821.1375
613	611	866.1500	821.1500
614	612	866.1625	821.1625
615	613	866.1750	821.1750
616	614	866.1875	821.1875
617	615	866.2000	821.2000
618	616	866.2125	821.2125
619	617	866.2250	821.2250
620	618	866.2375	821.2375
621	619	866.2500	821.2500
622	620	866.2625	821.2625
623	621	866.2750	821.2750
624	622	866.2875	821.2875
625	623	866.3000	821.3000
626	624	866.3125	821.3125
627	625	866.3250	821.3250
628	626	866.3375	821.3375
629	627	866.3500	821.3500
630	628	866.3625	821.3625
631	629	866.3750	821.3750
632	630	866.3875	821.3875
633	631	866.4000	821.4000
634	632	866.4125	821.4125
635	633	866.4250	821.4250
636	634	866.4375	821.4375

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
637	635	866.4500	821.4500
638	636	866.4625	821.4625
639	637	866.4750	821.4750
640	638	866.4875	821.4875
641	-	866.5000	821.5000
642	639	866.5125	821.5125
643	-	866.5250	821.5250
644	640	866.5375	821.5375
645	641	866.5500	821.5500
646	642	866.5625	821.5625
647	643	866.5750	821.5750
648	644	866.5875	821.5875
649	645	866.6000	821.6000
650	646	866.6125	821.6125
651	647	866.6250	821.6250
652	648	866.6375	821.6375
653	649	866.6500	821.6500
654	650	866.6625	821.6625
655	651	866.6750	821.6750
656	652	866.6875	821.6875
657	653	866.7000	821.7000
658	654	866.7125	821.7125
659	655	866.7250	821.7250
660	656	866.7375	821.7375
661	657	866.7500	821.7500
662	658	866.7625	821.7625
663	659	866.7750	821.7750
664	660	866.7875	821.7875
665	661	866.8000	821.8000
666	662	866.8125	821.8125
667	663	866.8250	821.8250
668	664	866.8375	821.8375
669	665	866.8500	821.8500
670	666	866.8625	821.8625
671	667	866.8750	821.8750
672	668	866.8875	821.8875
673	669	866.9000	821.9000
674	670	866.9125	821.9125
675	671	866.9250	821.9250
676	672	866.9375	821.9375
677	673	866.9500	821.9500

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
678	674	866.9625	821.9625
679	675	866.9750	821.9750
680	676	866.9875	821.9875
681	-	867.0000	822.0000
682	677	867.0125	822.0125
683	-	867.0250	822.0250
684	678	867.0375	822.0375
685	679	867.0500	822.0500
686	680	867.0625	822.0625
687	681	867.0750	822.0750
688	682	867.0875	822.0875
689	683	867.1000	822.1000
690	684	867.1125	822.1125
691	685	867.1250	822.1250
692	686	867.1375	822.1375
693	687	867.1500	822.1500
694	688	867.1625	822.1625
695	689	867.1750	822.1750
696	690	867.1875	822.1875
697	691	867.2000	822.2000
698	692	867.2125	822.2125
699	693	867.2250	822.2250
700	694	867.2375	822.2375
701	695	867.2500	822.2500
702	696	867.2625	822.2625
703	697	867.2750	822.2750
704	698	867.2875	822.2875
705	699	867.3000	822.3000
706	700	867.3125	822.3125
707	701	867.3250	822.3250
708	702	867.3375	822.3375
709	703	867.3500	822.3500
710	704	867.3625	822.3625
711	705	867.3750	822.3750
712	706	867.3875	822.3875
713	707	867.4000	822.4000
714	708	867.4125	822.4125
715	709	867.4250	822.4250
716	710	867.4375	822.4375
717	711	867.4500	822.4500
718	712	867.4625	822.4625

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
719	713	867.4750	822.4750
720	714	867.4875	822.4875
721	-	867.5000	822.5000
722	715	867.5125	822.5125
723	-	867.5250	822.5250
724	716	867.5375	822.5375
725	717	867.5500	822.5500
726	718	867.5625	822.5625
727	719	867.5750	822.5750
728	720	867.5875	822.5875
729	721	867.6000	822.6000
730	722	867.6125	822.6125
731	723	867.6250	822.6250
732	724	867.6375	822.6375
733	725	867.6500	822.6500
734	726	867.6625	822.6625
735	727	867.6750	822.6750
736	728	867.6875	822.6875
737	729	867.7000	822.7000
738	730	867.7125	822.7125
739	731	867.7250	822.7250
740	732	867.7375	822.7375
741	733	867.7500	822.7500
742	734	867.7625	822.7625
743	735	867.7750	822.7750
744	736	867.7875	822.7875
745	737	867.8000	822.8000
746	738	867.8125	822.8125
747	739	867.8250	822.8250
748	740	867.8375	822.8375
749	741	867.8500	822.8500
750	742	867.8625	822.8625
751	743	867.8750	822.8750
752	744	867.8875	822.8875
753	745	867.9000	822.9000
754	746	867.9125	822.9125
755	747	867.9250	822.9250
756	748	867.9375	822.9375
757	749	867.9500	822.9500
758	750	867.9625	822.9625
759	751	867.9750	822.9750

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
760	752	867.9875	822.9875
761	-	868.0000	823.0000
762	753	868.0125	823.0125
763	-	868.0250	823.0250
764	754	868.0375	823.0375
765	755	868.0500	823.0500
766	756	868.0625	823.0625
767	757	868.0750	823.0750
768	758	868.0875	823.0875
769	759	868.1000	823.1000
770	760	868.1125	823.1125
771	761	868.1250	823.1250
772	762	868.1375	823.1375
773	763	868.1500	823.1500
774	764	868.1625	823.1625
775	765	868.1750	823.1750
776	766	868.1875	823.1875
777	767	868.2000	823.2000
778	768	868.2125	823.2125
779	769	868.2250	823.2250
780	770	868.2375	823.2375
781	771	868.2500	823.2500
782	772	868.2625	823.2625
783	773	868.2750	823.2750
784	774	868.2875	823.2875
785	775	868.3000	823.3000
786	776	868.3125	823.3125
787	777	868.3250	823.3250
788	778	868.3375	823.3375
789	779	868.3500	823.3500
790	780	868.3625	823.3625
791	781	868.3750	823.3750
792	782	868.3875	823.3875
793	783	868.4000	823.4000
794	784	868.4125	823.4125
795	785	868.4250	823.4250
796	786	868.4375	823.4375
797	787	868.4500	823.4500
798	788	868.4625	823.4625
799	789	868.4750	823.4750
800	790	868.4875	823.4875

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
801	791	868.5000	823.5000
802	792	868.5125	823.5125
803	793	868.5250	823.5250
804	794	868.5375	823.5375
805	795	868.5500	823.5500
806	796	868.5625	823.5625
807	797	868.5750	823.5750
808	798	868.5875	823.5875
809	799	868.6000	823.6000
810	800	868.6125	823.6125
811	801	868.6250	823.6250
812	802	868.6375	823.6375
813	803	868.6500	823.6500
814	804	868.6625	823.6625
815	805	868.6750	823.6750
816	806	868.6875	823.6875
817	807	868.7000	823.7000
818	808	868.7125	823.7125
819	809	868.7250	823.7250
820	810	868.7375	823.7375
821	811	868.7500	823.7500
822	812	868.7625	823.7625
823	813	868.7750	823.7750
824	814	868.7875	823.7875
825	815	868.8000	823.8000
826	816	868.8125	823.8125
827	817	868.8250	823.8250
828	818	868.8375	823.8375
829	819	868.8500	823.8500
830	820	868.8625	823.8625
831	821	868.8750	823.8750
832	822	868.8875	823.8875
833	823	868.9000	823.9000
834	824	868.9125	823.9125
835	825	868.9250	823.9250
836	826	868.9375	823.9375
837	827	868.9500	823.9500
838	828	868.9625	823.9625
839	829	868.9750	823.9750
840	830	868.9875	823.9875
841	-	869.0000	824.0000

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
842	-	869.0125	824.0125
843	-	869.0250	824.0250
844	-	869.0375	824.0375
845	-	869.0500	824.0500
846	-	869.0625	824.0625
847	-	869.0750	824.0750
848	-	869.0875	824.0875
849	-	869.1000	824.1000
850	-	869.1125	824.1125
851	-	869.1250	824.1250
852	-	869.1375	824.1375
853	-	869.1500	824.1500
854	-	869.1625	824.1625
855	-	869.1750	824.1750
856	-	869.1875	824.1875
857	-	869.2000	824.2000
858	-	869.2125	824.2125
859	-	869.2250	824.2250
860	-	869.2375	824.2375
861	-	869.2500	824.2500
862	-	869.2625	824.2625
863	-	869.2750	824.2750
864	-	869.2875	824.2875
865	-	869.3000	824.3000
866	-	869.3125	824.3125
867	-	869.3250	824.3250
868	-	869.3375	824.3375
869	-	869.3500	824.3500
870	-	869.3625	824.3625
871	-	869.3750	824.3750
872	-	869.3875	824.3875
873	-	869.4000	824.4000
874	-	869.4125	824.4125
875	-	869.4250	824.4250
876	-	869.4375	824.4375
877	-	869.4500	824.4500
878	-	869.4625	824.4625
879	-	869.4750	824.4750
880	-	869.4875	824.4875
881	-	869.5000	824.5000
882	-	869.5125	824.5125

Table 18.1 800 MHz Channels (continued)

Program Channel	FCC Channel	RX Freq	TX Freq
883	-	869.5250	824.5250
884	-	869.5375	824.5375
885	-	869.5500	824.5500
886	-	869.5625	824.5625
887	-	869.5750	824.5750
888	-	869.5875	824.5875
889	-	869.6000	824.6000
890	-	869.6125	824.6125
891	-	869.6250	824.6250
892	-	869.6375	824.6375
893	-	869.6500	824.6500
894	-	869.6625	824.6625
895	-	869.6750	824.6750
896	-	869.6875	824.6875
897	-	869.7000	824.7000
898	-	869.7125	824.7125
899	-	869.7250	824.7250
900	-	869.7375	824.7375
901	-	869.7500	824.7500
902	-	869.7625	824.7625
903	-	869.7750	824.7750
904	-	869.7875	824.7875
905	-	869.8000	824.8000
906	-	869.8125	824.8125
907	-	869.8250	824.8250
908	-	869.8375	824.8375
909	-	869.8500	824.8500
910	-	869.8625	824.8625
911	-	869.8750	824.8750
912	-	869.8875	824.8875
913	-	869.9000	824.9000
914	-	869.9125	824.9125
915	-	869.9250	824.9250
916	-	869.9375	824.9375
917	-	869.9500	824.9500
918	-	869.9625	824.9625
919	-	869.9750	824.9750
920	-	869.9875	824.9875

Table 18.2 lists the FCC's 900 MHz channels and each channel's associated receive frequency (RX Freq) and transmit frequency (TX Freq).

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Freq	Tx Freq
1	1	935.0125	896.0125
2	2	935.0250	896.0250
3	3	935.0375	896.0375
4	4	935.0500	896.0500
5	5	935.0625	896.0625
6	6	935.0750	896.0750
7	7	935.0875	896.0875
8	8	935.1000	896.1000
9	9	935.1125	896.1125
10	10	935.1250	896.1250
11	11	935.1375	896.1375
12	12	935.1500	896.1500
13	13	935.1625	896.1625
14	14	935.1750	896.1750
15	15	935.1875	896.1875
16	16	935.2000	896.2000
17	17	935.2125	896.2125
18	18	935.2250	896.2250
19	19	935.2375	896.2375
20	20	935.2500	896.2500
21	21	935.2625	896.2625
22	22	935.2750	896.2750
23	23	935.2875	896.2875
24	24	935.3000	896.3000
25	25	935.3125	896.3125
26	26	935.3250	896.3250
27	27	935.3375	896.3375
28	28	935.3500	896.3500
29	29	935.3625	896.3625
30	30	935.3750	896.3750
31	31	935.3875	896.3875
32	32	935.4000	896.4000
33	33	935.4125	896.4125
34	34	935.4250	896.4250
35	35	935.4375	896.4375
36	36	935.4500	896.4500
37	37	935.4625	896.4625
38	38	935.4750	896.4750

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Freq	Tx Freq
39	39	935.4875	896.4875
40	40	935.5000	896.5000
41	41	935.5125	896.5125
42	42	935.5250	896.5250
43	43	935.5375	896.5375
44	44	935.5500	896.5500
45	45	935.5625	896.5625
46	46	935.5750	896.5750
47	47	935.5875	896.5875
48	48	935.6000	896.6000
49	49	935.6125	896.6125
50	50	935.6250	896.6250
51	51	935.6375	896.6375
52	52	935.6500	896.6500
53	53	935.6625	896.6625
54	54	935.6750	896.6750
55	55	935.6875	896.6875
56	56	935.7000	896.7000
57	57	935.7125	896.7125
58	58	935.7250	896.7250
59	59	935.7375	896.7375
60	60	935.7500	896.7500
61	61	935.7625	896.7625
62	62	935.7750	896.7750
63	63	935.7875	896.7875
64	64	935.8000	896.8000
65	65	935.8125	896.8125
66	66	935.8250	896.8250
67	67	935.8375	896.8375
68	68	935.8500	896.8500
69	69	935.8625	896.8625
70	70	935.8750	896.8750
71	71	935.8875	896.8875
72	72	935.9000	896.9000
73	73	935.9125	896.9125
74	74	935.9250	896.9250
75	75	935.9375	896.9375
76	76	935.9500	896.9500
77	77	935.9625	896.9625

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Freq	Tx Freq
78	78	935.9750	896.9750
79	79	935.9875	896.9875
80	80	936.0000	897.0000
81	81	936.0125	897.0125
82	82	936.0250	897.0250
83	83	936.0375	897.0375
84	84	936.0500	897.0500
85	85	936.0625	897.0625
86	86	936.0750	897.0750
87	87	936.0875	897.0875
88	88	936.1000	897.1000
89	89	936.1125	897.1125
90	90	936.1250	897.1250
91	91	936.1375	897.1375
92	92	936.1500	897.1500
93	93	936.1625	897.1625
94	94	936.1750	897.1750
95	95	936.1875	897.1875
96	96	936.2000	897.2000
97	97	936.2125	897.2125
98	98	936.2250	897.2250
99	99	936.2375	897.2375
100	100	936.2500	897.2500
101	101	936.2625	897.2625
102	102	936.2750	897.2750
103	103	936.2875	897.2875
104	104	936.3000	897.3000
105	105	936.3125	897.3125
106	106	936.3250	897.3250
107	107	936.3375	897.3375
108	108	936.3500	897.3500
109	109	936.3625	897.3625
1	1	936.3750	897.3750
111	111	936.3875	897.3875
112	112	936.4000	897.4000
113	113	936.4125	897.4125
114	114	936.4250	897.4250
115	115	936.4375	897.4375
116	116	936.4500	897.4500
117	117	936.4625	897.4625
118	118	936.4750	897.4750

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Freq	Tx Freq
119	119	936.4875	897.4875
120	120	936.5000	897.5000
121	121	936.5125	897.5125
122	122	936.5250	897.5250
123	123	936.5375	897.5375
124	124	936.5500	897.5500
125	125	936.5625	897.5625
126	126	936.5750	897.5750
127	127	936.5875	897.5875
128	128	936.6000	897.6000
129	129	936.6125	897.6125
130	130	936.6250	897.6250
131	131	936.6375	897.6375
132	132	936.6500	897.6500
133	133	936.6625	897.6625
134	134	936.6750	897.6750
135	135	936.6875	897.6875
136	136	936.7000	897.7000
137	137	936.7125	897.7125
138	138	936.7250	897.7250
139	139	936.7375	897.7375
140	140	936.7500	897.7500
141	141	936.7625	897.7625
142	142	936.7750	897.7750
143	143	936.7875	897.7875
144	144	936.8000	897.8000
145	145	936.8125	897.8125
146	146	936.8250	897.8250
147	147	936.8375	897.8375
148	148	936.8500	897.8500
149	149	936.8625	897.8625
150	150	936.8750	897.8750
151	151	936.8875	897.8875
152	152	936.9000	897.9000
153	153	936.9125	897.9125
154	154	936.9250	897.9250
155	155	936.9375	897.9375
156	156	936.9500	897.9500
157	157	936.9625	897.9625
158	158	936.9750	897.9750
159	159	936.9875	897.9875

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Freq	Tx Freq
160	160	937.0000	898.0000
161	161	937.0125	898.0125
162	162	937.0250	898.0250
163	163	937.0375	898.0375
164	164	937.0500	898.0500
165	165	937.0625	898.0625
166	166	937.0750	898.0750
167	167	937.0875	898.0875
168	168	937.1000	898.1000
169	169	937.1125	898.1125
170	170	937.1250	898.1250
171	171	937.1375	898.1375
172	172	937.1500	898.1500
173	173	937.1625	898.1625
174	174	937.1750	898.1750
175	175	937.1875	898.1875
176	176	937.2000	898.2000
177	177	937.2125	898.2125
178	178	937.2250	898.2250
179	179	937.2375	898.2375
180	180	937.2500	898.2500
181	181	937.2625	898.2625
182	182	937.2750	898.2750
183	183	937.2875	898.2875
184	184	937.3000	898.3000
185	185	937.3125	898.3125
186	186	937.3250	898.3250
187	187	937.3375	898.3375
188	188	937.3500	898.3500
189	189	937.3625	898.3625
190	190	937.3750	898.3750
191	191	937.3875	898.3875
192	192	937.4000	898.4000
193	193	937.4125	898.4125
194	194	937.4250	898.4250
195	195	937.4375	898.4375
196	196	937.4500	898.4500
197	197	937.4625	898.4625
198	198	937.4750	898.4750
199	199	937.4875	898.4875
200	200	937.5000	898.5000

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Freq	Tx Freq
201	201	937.5125	898.5125
202	202	937.5250	898.5250
203	203	937.5375	898.5375
204	204	937.5500	898.5500
205	205	937.5625	898.5625
206	206	937.5750	898.5750
207	207	937.5875	898.5875
208	208	937.6000	898.6000
209	209	937.6125	898.6125
210	210	937.6250	898.6250
211	211	937.6375	898.6375
212	212	937.6500	898.6500
213	213	937.6625	898.6625
214	214	937.6750	898.6750
215	215	937.6875	898.6875
216	216	937.7000	898.7000
217	217	937.7125	898.7125
218	218	937.7250	898.7250
219	219	937.7375	898.7375
220	220	937.7500	898.7500
221	221	937.7625	898.7625
222	222	937.7750	898.7750
223	223	937.7875	898.7875
224	224	937.8000	898.8000
225	225	937.8125	898.8125
226	226	937.8250	898.8250
227	227	937.8375	898.8375
228	228	937.8500	898.8500
229	229	937.8625	898.8625
230	230	937.8750	898.8750
231	231	937.8875	898.8875
232	232	937.9000	898.9000
233	233	937.9125	898.9125
234	234	937.9250	898.9250
235	235	937.9375	898.9375
236	236	937.9500	898.9500
237	237	937.9625	898.9625
238	238	937.9750	898.9750
239	239	937.9875	898.9875
240	240	938.0000	899.0000
241	241	938.0125	899.0125

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Freq	Tx Freq
242	242	938.0250	899.0250
243	243	938.0375	899.0375
244	244	938.0500	899.0500
245	245	938.0625	899.0625
246	246	938.0750	899.0750
247	247	938.0875	899.0875
248	248	938.1000	899.1000
249	249	938.1125	899.1125
250	250	938.1250	899.1250
251	251	938.1375	899.1375
252	252	938.1500	899.1500
253	253	938.1625	899.1625
254	254	938.1750	899.1750
255	255	938.1875	899.1875
256	256	938.2000	899.2000
257	257	938.2125	899.2125
258	258	938.2250	899.2250
259	259	938.2375	899.2375
260	260	938.2500	899.2500
261	261	938.2625	899.2625
262	262	938.2750	899.2750
263	263	938.2875	899.2875
264	264	938.3000	899.3000
265	265	938.3125	899.3125
266	266	938.3250	899.3250
267	267	938.3375	899.3375
268	268	938.3500	899.3500
269	269	938.3625	899.3625
270	270	938.3750	899.3750
271	271	938.3875	899.3875
272	272	938.4000	899.4000
273	273	938.4125	899.4125
274	274	938.4250	899.4250
275	275	938.4375	899.4375
276	276	938.4500	899.4500
277	277	938.4625	899.4625
278	278	938.4750	899.4750
279	279	938.4875	899.4875
280	280	938.5000	899.5000
281	281	938.5125	899.5125
282	282	938.5250	899.5250

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Freq	Tx Freq
283	283	938.5375	899.5375
284	284	938.5500	899.5500
285	285	938.5625	899.5625
286	286	938.5750	899.5750
287	287	938.5875	899.5875
288	288	938.6000	899.6000
289	289	938.6125	899.6125
290	290	938.6250	899.6250
291	291	938.6375	899.6375
292	292	938.6500	899.6500
293	293	938.6625	899.6625
294	294	938.6750	899.6750
295	295	938.6875	899.6875
296	296	938.7000	899.7000
297	297	938.7125	899.7125
298	298	938.7250	899.7250
299	299	938.7375	899.7375
300	300	938.7500	899.7500
301	301	938.7625	899.7625
302	302	938.7750	899.7750
303	303	938.7875	899.7875
304	304	938.8000	899.8000
305	305	938.8125	899.8125
306	306	938.8250	899.8250
307	307	938.8375	899.8375
308	308	938.8500	899.8500
309	309	938.8625	899.8625
310	310	938.8750	899.8750
311	311	938.8875	899.8875
312	312	938.9000	899.9000
313	313	938.9125	899.9125
314	314	938.9250	899.9250
315	315	938.9375	899.9375
316	316	938.9500	899.9500
317	317	938.9625	899.9625
318	318	938.9750	899.9750
319	319	938.9875	899.9875
320	320	939.0000	900.0000
321	321	939.0125	900.0125
322	322	939.0250	900.0250
323	323	939.0375	900.0375

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Freq	Tx Freq
324	324	939.0500	900.0500
325	325	939.0625	900.0625
326	326	939.0750	900.0750
327	327	939.0875	900.0875
328	328	939.1000	900.1000
329	329	939.1125	900.1125
330	330	939.1250	900.1250
331	331	939.1375	900.1375
332	332	939.1500	900.1500
333	333	939.1625	900.1625
334	334	939.1750	900.1750
335	335	939.1875	900.1875
336	336	939.2000	900.2000
337	337	939.2125	900.2125
338	338	939.2250	900.2250
339	339	939.2375	900.2375
340	340	939.2500	900.2500
341	341	939.2625	900.2625
342	342	939.2750	900.2750
343	343	939.2875	900.2875
344	344	939.3000	900.3000
345	345	939.3125	900.3125
346	346	939.3250	900.3250
347	347	939.3375	900.3375
348	348	939.3500	900.3500
349	349	939.3625	900.3625
350	350	939.3750	900.3750
351	351	939.3875	900.3875
352	352	939.4000	900.4000
353	353	939.4125	900.4125
354	354	939.4250	900.4250
355	355	939.4375	900.4375
356	356	939.4500	900.4500
357	357	939.4625	900.4625
358	358	939.4750	900.4750
359	359	939.4875	900.4875
360	360	939.5000	900.5000
361	361	939.5125	900.5125
362	362	939.5250	900.5250
363	363	939.5375	900.5375
364	364	939.5500	900.5500

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Freq	Tx Freq
365	365	939.5625	900.5625
366	366	939.5750	900.5750
367	367	939.5875	900.5875
368	368	939.6000	900.6000
369	369	939.6125	900.6125
370	370	939.6250	900.6250
371	371	939.6375	900.6375
372	372	939.6500	900.6500
373	373	939.6625	900.6625
374	374	939.6750	900.6750
375	375	939.6875	900.6875
376	376	939.7000	900.7000
377	377	939.7125	900.7125
378	378	939.7250	900.7250
379	379	939.7375	900.7375
380	380	939.7500	900.7500
381	381	939.7625	900.7625
382	382	939.7750	900.7750
383	383	939.7875	900.7875
384	384	939.8000	900.8000
385	385	939.8125	900.8125
386	386	939.8250	900.8250
387	387	939.8375	900.8375
388	388	939.8500	900.8500
389	389	939.8625	900.8625
390	390	939.8750	900.8750
391	391	939.8875	900.8875
392	392	939.9000	900.9000
393	393	939.9125	900.9125
394	394	939.9250	900.9250
395	395	939.9375	900.9375
396	396	939.9500	900.9500
397	397	939.9625	900.9625
398	398	939.9750	900.9750
399	399	939.9875	900.9875
400	400	940.0000	901.0000
401	401	940.0125	901.0125
402	402	940.0250	901.0250
403	403	940.0375	901.0375
404	404	940.0500	901.0500
405	405	940.0625	901.0625

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Freq	Tx Freq
406	406	940.0750	901.0750
407	407	940.0875	901.0875
408	408	940.1000	901.1000
409	409	940.1125	901.1125
410	410	940.1250	901.1250
411	411	940.1375	901.1375
412	412	940.1500	901.1500
413	413	940.1625	901.1625
414	414	940.1750	901.1750
415	415	940.1875	901.1875
	416	940.2000	901.2000
	417	940.2125	901.2125
	418	940.2250	901.2250
	419	940.2375	901.2375
	420	940.2500	901.2500
	421	940.2625	901.2625
	422	940.2750	901.2750
	423	940.2875	901.2875
	424	940.3000	901.3000
	425	940.3125	901.3125
	426	940.3250	901.3250
	427	940.3375	901.3375
	428	940.3500	901.3500
	429	940.3625	901.3625
	430	940.3750	901.3750
	431	940.3875	901.3875
	432	940.4000	901.4000
	433	940.4125	901.4125
	434	940.4250	901.4250
	435	940.4375	901.4375
	436	940.4500	901.4500
	437	940.4625	901.4625
	438	940.4750	901.4750
	439	940.4875	901.4875
	440	940.5000	901.5000
	441	940.5125	901.5125
	442	940.5250	901.5250
	443	940.5375	901.5375
	444	940.5500	901.5500
	445	940.5625	901.5625
	446	940.5750	901.5750

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Freq	Tx Freq
	447	940.5875	901.5875
	448	940.6000	901.6000
	449	940.6125	901.6125
	450	940.6250	901.6250
	451	940.6375	901.6375
	452	940.6500	901.6500
	453	940.6625	901.6625
	454	940.6750	901.6750
	455	940.6875	901.6875
	456	940.7000	901.7000
	457	940.7125	901.7125
	458	940.7250	901.7250
	459	940.7375	901.7375
	460	940.7500	901.7500
	461	940.7625	901.7625
	462	940.7750	901.7750
	463	940.7875	901.7875
	464	940.8000	901.8000
	465	940.8125	901.8125
	466	940.8250	901.8250
	467	940.8375	901.8375
	468	940.8500	901.8500
	469	940.8625	901.8625
	470	940.8750	901.8750
	471	940.8875	901.8875
	472	940.9000	901.9000
	473	940.9125	901.9125
	474	940.9250	901.9250
	475	940.9375	901.9375
	476	940.9500	901.9500
	477	940.9625	901.9625
	478	940.9750	901.9750
	479	940.9875	901.9875

Figures 18.3 through 18.8 show rebanding channel frequencies.

Tx offset is 7200 below Rx

800 MHz Reband Range 1 Rx Ref Base = 8160
Offset = 8160+(Chann#*2)

800 MHz Reband Range 2 Rx Ref Base = 7680
Offset = 7680+(Chann#*4)

7/800 MHz Reband Range 1 Rx Ref Base = 14558
Offset = 14558+(Chann#2)

7/800 MHz Reband Range 2 Rx Ref Base = 14798
Offset = 14798+(Chann#*4)

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
1 ¹	1 ²	851.0125	806.0125		8162	51,012,500	14562	91,012,500
2	na	851.0250	806.0250		8164	51,025,000	14564	91,025,000
3	2	851.0375	806.0375		8166	51,037,500	14566	91,037,500
4	3	851.0500	806.0500		8168	51,050,000	14568	91,050,000
5	4	851.0625	806.0625		8170	51,062,500	14570	91,062,500
6	5	851.0750	806.0750		8172	51,075,000	14572	91,075,000
7	6	851.0875	806.0875		8174	51,087,500	14574	91,087,500
8	7	851.1000	806.1000		8176	51,100,000	14576	91,100,000
9	8	851.1125	806.1125		8178	51,112,500	14578	91,112,500
10	9	851.1250	806.1250		8180	51,125,000	14580	91,125,000
11	10	851.1375	806.1375		8182	51,137,500	14582	91,137,500
12	11	851.1500	806.1500		8184	51,150,000	14584	91,150,000
13	12	851.1625	806.1625		8186	51,162,500	14586	91,162,500
14	13	851.1750	806.1750		8188	51,175,000	14588	91,175,000
15	14	851.1875	806.1875		8190	51,187,500	14590	91,187,500
16	15	851.2000	806.2000		8192	51,200,000	14592	91,200,000
17	16	851.2125	806.2125		8194	51,212,500	14594	91,212,500
18	17	851.2250	806.2250		8196	51,225,000	14596	91,225,000
19	18	851.2375	806.2375		8198	51,237,500	14598	91,237,500
20	19	851.2500	806.2500		8200	51,250,000	14600	91,250,000
21	20	851.2625	806.2625		8202	51,262,500	14602	91,262,500
22	21	851.2750	806.2750		8204	51,275,000	14604	91,275,000
23	22	851.2875	806.2875		8206	51,287,500	14606	91,287,500
24	23	851.3000	806.3000		8208	51,300,000	14608	91,300,000
25	24	851.3125	806.3125		8210	51,312,500	14610	91,312,500
26	25	851.3250	806.3250		8212	51,325,000	14612	91,325,000

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
27	26	851.3375	806.3375		8214	51,337,500	14614	91,337,500
28	27	851.3500	806.3500		8216	51,350,000	14616	91,350,000
29	28	851.3625	806.3625		8218	51,362,500	14618	91,362,500
30	29	851.3750	806.3750		8220	51,375,000	14620	91,375,000
31	30	851.3875	806.3875		8222	51,387,500	14622	91,387,500
32	31	851.4000	806.4000		8224	51,400,000	14624	91,400,000
33	32	851.4125	806.4125		8226	51,412,500	14626	91,412,500
34	33	851.4250	806.4250		8228	51,425,000	14628	91,425,000
35	34	851.4375	806.4375		8230	51,437,500	14630	91,437,500
36	35	851.4500	806.4500		8232	51,450,000	14632	91,450,000
37	36	851.4625	806.4625		8234	51,462,500	14634	91,462,500
38	37	851.4750	806.4750		8236	51,475,000	14636	91,475,000
39	38	851.4875	806.4875		8238	51,487,500	14638	91,487,500
40	na	851.5000	806.5000		8240	51,500,000	14640	91,500,000
41 ¹	39	851.5125	806.5125		8242	51,512,500	14642	91,512,500
42	na	851.5250	806.5250		8244	51,525,000	14644	91,525,000
43	40	851.5375	806.5375		8246	51,537,500	14646	91,537,500
44	41	851.5500	806.5500		8248	51,550,000	14648	91,550,000
45	42	851.5625	806.5625		8250	51,562,500	14650	91,562,500
46	43	851.5750	806.5750		8252	51,575,000	14652	91,575,000
47	44	851.5875	806.5875		8254	51,587,500	14654	91,587,500
48	45	851.6000	806.6000		8256	51,600,000	14656	91,600,000
49	46	851.6125	806.6125		8258	51,612,500	14658	91,612,500
50	47	851.6250	806.6250		8260	51,625,000	14660	91,625,000
51	48	851.6375	806.6375		8262	51,637,500	14662	91,637,500
52	49	851.6500	806.6500		8264	51,650,000	14664	91,650,000
53	50	851.6625	806.6625		8266	51,662,500	14666	91,662,500
54	51	851.6750	806.6750		8268	51,675,000	14668	91,675,000
55	52	851.6875	806.6875		8270	51,687,500	14670	91,687,500
56	53	851.7000	806.7000		8272	51,700,000	14672	91,700,000
57	54	851.7125	806.7125		8274	51,712,500	14674	91,712,500
58	55	851.7250	806.7250		8276	51,725,000	14676	91,725,000
59	56	851.7375	806.7375		8278	51,737,500	14678	91,737,500
60	57	851.7500	806.7500		8280	51,750,000	14680	91,750,000
61	58	851.7625	806.7625		8282	51,762,500	14682	91,762,500
62	59	851.7750	806.7750		8284	51,775,000	14684	91,775,000
63	60	851.7875	806.7875		8286	51,787,500	14686	91,787,500
64	61	851.8000	806.8000		8288	51,800,000	14688	91,800,000

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
65	62	851.8125	806.8125		8290	51,812,500	14690	91,812,500
66	63	851.8250	806.8250		8292	51,825,000	14692	91,825,000
67	64	851.8375	806.8375		8294	51,837,500	14694	91,837,500
68	65	851.8500	806.8500		8296	51,850,000	14696	91,850,000
69	66	851.8625	806.8625		8298	51,862,500	14698	91,862,500
70	67	851.8750	806.8750		8300	51,875,000	14700	91,875,000
71	68	851.8875	806.8875		8302	51,887,500	14702	91,887,500
72	69	851.9000	806.9000		8304	51,900,000	14704	91,900,000
73	70	851.9125	806.9125		8306	51,912,500	14706	91,912,500
74	71	851.9250	806.9250		8308	51,925,000	14708	91,925,000
75	72	851.9375	806.9375		8310	51,937,500	14710	91,937,500
76	73	851.9500	806.9500		8312	51,950,000	14712	91,950,000
77	74	851.9625	806.9625		8314	51,962,500	14714	91,962,500
78	75	851.9750	806.9750		8316	51,975,000	14716	91,975,000
79	76	851.9875	806.9875		8318	51,987,500	14718	91,987,500
80	na	852.0000	807.0000		8320	52,000,000	14720	92,000,000
81 ¹	77	852.0125	807.0125		8322	52,012,500	14722	92,012,500
82	na	852.0250	807.0250		8324	52,025,000	14724	92,025,000
83	78	852.0375	807.0375		8326	52,037,500	14726	92,037,500
84	79	852.0500	807.0500		8328	52,050,000	14728	92,050,000
85	80	852.0625	807.0625		8330	52,062,500	14730	92,062,500
86	81	852.0750	807.0750		8332	52,075,000	14732	92,075,000
87	82	852.0875	807.0875		8334	52,087,500	14734	92,087,500
88	83	852.1000	807.1000		8336	52,100,000	14736	92,100,000
89	84	852.1125	807.1125		8338	52,112,500	14738	92,112,500
90	85	852.1250	807.1250		8340	52,125,000	14740	92,125,000
91	86	852.1375	807.1375		8342	52,137,500	14742	92,137,500
92	87	852.1500	807.1500		8344	52,150,000	14744	92,150,000
93	88	852.1625	807.1625		8346	52,162,500	14746	92,162,500
94	89	852.1750	807.1750		8348	52,175,000	14748	92,175,000
95	90	852.1875	807.1875		8350	52,187,500	14750	92,187,500
96	91	852.2000	807.2000		8352	52,200,000	14752	92,200,000
97	92	852.2125	807.2125		8354	52,212,500	14754	92,212,500
98	93	852.2250	807.2250		8356	52,225,000	14756	92,225,000
99	94	852.2375	807.2375		8358	52,237,500	14758	92,237,500
100	95	852.2500	807.2500		8360	52,250,000	14760	92,250,000
101	96	852.2625	807.2625		8362	52,262,500	14762	92,262,500
102	97	852.2750	807.2750		8364	52,275,000	14764	92,275,000

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
103	98	852.2875	807.2875		8366	52,287,500	14766	92,287,500
104	99	852.3000	807.3000		8368	52,300,000	14768	92,300,000
105	100	852.3125	807.3125		8370	52,312,500	14770	92,312,500
106	101	852.3250	807.3250		8372	52,325,000	14772	92,325,000
107	102	852.3375	807.3375		8374	52,337,500	14774	92,337,500
108	103	852.3500	807.3500		8376	52,350,000	14776	92,350,000
109	104	852.3625	807.3625		8378	52,362,500	14778	92,362,500
110	105	852.3750	807.3750		8380	52,375,000	14780	92,375,000
111	106	852.3875	807.3875		8382	52,387,500	14782	92,387,500
112	107	852.4000	807.4000		8384	52,400,000	14784	92,400,000
113	108	852.4125	807.4125		8386	52,412,500	14786	92,412,500
114	109	852.4250	807.4250		8388	52,425,000	14788	92,425,000
115	110	852.4375	807.4375		8390	52,437,500	14790	92,437,500
116	111	852.4500	807.4500		8392	52,450,000	14792	92,450,000
117	112	852.4625	807.4625		8394	52,462,500	14794	92,462,500
118	113	852.4750	807.4750		8396	52,475,000	14796	92,475,000
119	114	852.4875	807.4875		8398	52,487,500	14798	92,487,500
120	na	852.5000	807.5000		8400	52,500,000	14800	92,500,000
121 ¹	115	852.5125	807.5125		8402	52,512,500	14802	92,512,500
122	na	852.5250	807.5250		8404	52,525,000	14804	92,525,000
123	116	852.5375	807.5375		8406	52,537,500	14806	92,537,500
124	117	852.5500	807.5500		8408	52,550,000	14808	92,550,000
125	118	852.5625	807.5625		8410	52,562,500	14810	92,562,500
126	119	852.5750	807.5750		8412	52,575,000	14812	92,575,000
127	120	852.5875	807.5875		8414	52,587,500	14814	92,587,500
128	121	852.6000	807.6000		8416	52,600,000	14816	92,600,000
129	122	852.6125	807.6125		8418	52,612,500	14818	92,612,500
130	123	852.6250	807.6250		8420	52,625,000	14820	92,625,000
131	124	852.6375	807.6375		8422	52,637,500	14822	92,637,500
132	125	852.6500	807.6500		8424	52,650,000	14824	92,650,000
133	126	852.6625	807.6625		8426	52,662,500	14826	92,662,500
134	127	852.6750	807.6750		8428	52,675,000	14828	92,675,000
135	128	852.6875	807.6875		8430	52,687,500	14830	92,687,500
136	129	852.7000	807.7000		8432	52,700,000	14832	92,700,000
137	130	852.7125	807.7125		8434	52,712,500	14834	92,712,500
138	131	852.7250	807.7250		8436	52,725,000	14836	92,725,000
139	132	852.7375	807.7375		8438	52,737,500	14838	92,737,500
140	133	852.7500	807.7500		8440	52,750,000	14840	92,750,000

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
141	134	852.7625	807.7625		8442	52,762,500	14842	92,762,500
142	135	852.7750	807.7750		8444	52,775,000	14844	92,775,000
143	136	852.7875	807.7875		8446	52,787,500	14846	92,787,500
144	137	852.8000	807.8000		8448	52,800,000	14848	92,800,000
145	138	852.8125	807.8125		8450	52,812,500	14850	92,812,500
146	139	852.8250	807.8250		8452	52,825,000	14852	92,825,000
147	140	852.8375	807.8375		8454	52,837,500	14854	92,837,500
148	141	852.8500	807.8500		8456	52,850,000	14856	92,850,000
149	142	852.8625	807.8625		8458	52,862,500	14858	92,862,500
150	143	852.8750	807.8750		8460	52,875,000	14860	92,875,000
151	144	852.8875	807.8875		8462	52,887,500	14862	92,887,500
152	145	852.9000	807.9000		8464	52,900,000	14864	92,900,000
153	146	852.9125	807.9125		8466	52,912,500	14866	92,912,500
154	147	852.9250	807.9250		8468	52,925,000	14868	92,925,000
155	148	852.9375	807.9375		8470	52,937,500	14870	92,937,500
156	149	852.9500	807.9500		8472	52,950,000	14872	92,950,000
157	150	852.9625	807.9625		8474	52,962,500	14874	92,962,500
158	151	852.9750	807.9750		8476	52,975,000	14876	92,975,000
159	152	852.9875	807.9875		8478	52,987,500	14878	92,987,500
160	na	853.0000	808.0000		8480	53,000,000	14880	93,000,000
161 ¹	153	853.0125	808.0125		8482	53,012,500	14882	93,012,500
162	na	853.0250	808.0250		8484	53,025,000	14884	93,025,000
163	154	853.0375	808.0375		8486	53,037,500	14886	93,037,500
164	155	853.0500	808.0500		8488	53,050,000	14888	93,050,000
165	156	853.0625	808.0625		8490	53,062,500	14890	93,062,500
166	157	853.0750	808.0750		8492	53,075,000	14892	93,075,000
167	158	853.0875	808.0875		8494	53,087,500	14894	93,087,500
168	159	853.1000	808.1000		8496	53,100,000	14896	93,100,000
169	160	853.1125	808.1125		8498	53,112,500	14898	93,112,500
170	161	853.1250	808.1250		8500	53,125,000	14900	93,125,000
171	162	853.1375	808.1375		8502	53,137,500	14902	93,137,500
172	163	853.1500	808.1500		8504	53,150,000	14904	93,150,000
173	164	853.1625	808.1625		8506	53,162,500	14906	93,162,500
174	165	853.1750	808.1750		8508	53,175,000	14908	93,175,000
175	166	853.1875	808.1875		8510	53,187,500	14910	93,187,500
176	167	853.2000	808.2000		8512	53,200,000	14912	93,200,000
177	168	853.2125	808.2125		8514	53,212,500	14914	93,212,500
178	169	853.2250	808.2250		8516	53,225,000	14916	93,225,000

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
179	170	853.2375	808.2375		8518	53,237,500	14918	93,237,500
180	171	853.2500	808.2500		8520	53,250,000	14920	93,250,000
181	172	853.2625	808.2625		8522	53,262,500	14922	93,262,500
182	173	853.2750	808.2750		8524	53,275,000	14924	93,275,000
183	174	853.2875	808.2875		8526	53,287,500	14926	93,287,500
184	175	853.3000	808.3000		8528	53,300,000	14928	93,300,000
185	176	853.3125	808.3125		8530	53,312,500	14930	93,312,500
186	177	853.3250	808.3250		8532	53,325,000	14932	93,325,000
187	178	853.3375	808.3375		8534	53,337,500	14934	93,337,500
188	179	853.3500	808.3500		8536	53,350,000	14936	93,350,000
189	180	853.3625	808.3625		8538	53,362,500	14938	93,362,500
190	181	853.3750	808.3750		8540	53,375,000	14940	93,375,000
191	182	853.3875	808.3875		8542	53,387,500	14942	93,387,500
192	183	853.4000	808.4000		8544	53,400,000	14944	93,400,000
193	184	853.4125	808.4125		8546	53,412,500	14946	93,412,500
194	185	853.4250	808.4250		8548	53,425,000	14948	93,425,000
195	186	853.4375	808.4375		8550	53,437,500	14950	93,437,500
196	187	853.4500	808.4500		8552	53,450,000	14952	93,450,000
197	188	853.4625	808.4625		8554	53,462,500	14954	93,462,500
198	189	853.4750	808.4750		8556	53,475,000	14956	93,475,000
199	190	853.4875	808.4875		8558	53,487,500	14958	93,487,500
200	191	853.5000	808.5000		8560	53,500,000	14960	93,500,000
201	192	853.5125	808.5125		8562	53,512,500	14962	93,512,500
202	193	853.5250	808.5250		8564	53,525,000	14964	93,525,000
203	194	853.5375	808.5375		8566	53,537,500	14966	93,537,500
204	195	853.5500	808.5500		8568	53,550,000	14968	93,550,000
205	196	853.5625	808.5625		8570	53,562,500	14970	93,562,500
206	197	853.5750	808.5750		8572	53,575,000	14972	93,575,000
207	198	853.5875	808.5875		8574	53,587,500	14974	93,587,500
208	199	853.6000	808.6000		8576	53,600,000	14976	93,600,000
209	200	853.6125	808.6125		8578	53,612,500	14978	93,612,500
210	201	853.6250	808.6250		8580	53,625,000	14980	93,625,000
211	202	853.6375	808.6375		8582	53,637,500	14982	93,637,500
212	203	853.6500	808.6500		8584	53,650,000	14984	93,650,000
213	204	853.6625	808.6625		8586	53,662,500	14986	93,662,500
214	205	853.6750	808.6750		8588	53,675,000	14988	93,675,000
215	206	853.6875	808.6875		8590	53,687,500	14990	93,687,500
216	207	853.7000	808.7000		8592	53,700,000	14992	93,700,000

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
217	208	853.7125	808.7125		8594	53,712,500	14994	93,712,500
218	209	853.7250	808.7250		8596	53,725,000	14996	93,725,000
219	210	853.7375	808.7375		8598	53,737,500	14998	93,737,500
220	211	853.7500	808.7500		8600	53,750,000	15000	93,750,000
221	212	853.7625	808.7625		8602	53,762,500	15002	93,762,500
222	213	853.7750	808.7750		8604	53,775,000	15004	93,775,000
223	214	853.7875	808.7875		8606	53,787,500	15006	93,787,500
224	215	853.8000	808.8000		8608	53,800,000	15008	93,800,000
225	216	853.8125	808.8125		8610	53,812,500	15010	93,812,500
226	217	853.8250	808.8250		8612	53,825,000	15012	93,825,000
227	218	853.8375	808.8375		8614	53,837,500	15014	93,837,500
228	219	853.8500	808.8500		8616	53,850,000	15016	93,850,000
229	220	853.8625	808.8625		8618	53,862,500	15018	93,862,500
230	221	853.8750	808.8750		8620	53,875,000	15020	93,875,000
231	222	853.8875	808.8875		8622	53,887,500	15022	93,887,500
232	223	853.9000	808.9000		8624	53,900,000	15024	93,900,000
233	224	853.9125	808.9125		8626	53,912,500	15026	93,912,500
234	225	853.9250	808.9250		8628	53,925,000	15028	93,925,000
235	226	853.9375	808.9375		8630	53,937,500	15030	93,937,500
236	227	853.9500	808.9500		8632	53,950,000	15032	93,950,000
237	228	853.9625	808.9625		8634	53,962,500	15034	93,962,500
238	229	853.9750	808.9750		8636	53,975,000	15036	93,975,000
239	230	853.9875	808.9875		8638	53,987,500	15038	93,987,500
non-NPSPAC					Band2 offset 7682		Band2 offset 14082	
FCC PSCII band section 30 channels at 25KHz spacing								
240	231	854.0125	809.0125		8642	54,012,500	15042	94,012,500
241	232	854.0375	809.0375		8646	54,037,500	15046	94,037,500
242	233	854.0625	809.0625		8650	54,062,500	15050	94,062,500
243	234	854.0875	809.0875		8654	54,087,500	15054	94,087,500
244	235	854.1125	809.1125		8658	54,112,500	15058	94,112,500
245	236	854.1375	809.1375		8662	54,137,500	15062	94,137,500
246	237	854.1625	809.1625		8666	54,162,500	15066	94,162,500
247	238	854.1875	809.1875		8670	54,187,500	15070	94,187,500
248	239	854.2125	809.2125		8674	54,212,500	15074	94,212,500
249	240	854.2375	809.2375		8678	54,237,500	15078	94,237,500
250	241	854.2625	809.2625		8682	54,262,500	15082	94,262,500
251	242	854.2875	809.2875		8686	54,287,500	15086	94,287,500

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
252	243	854.3125	809.3125		8690	54,312,500	15090	94,312,500
253	244	854.3375	809.3375		8694	54,337,500	15094	94,337,500
254	245	854.3625	809.3625		8698	54,362,500	15098	94,362,500
255	246	854.3875	809.3875		8702	54,387,500	15102	94,387,500
256	247	854.4125	809.4125		8706	54,412,500	15106	94,412,500
257	248	854.4375	809.4375		8710	54,437,500	15110	94,437,500
258	249	854.4625	809.4625		8714	54,462,500	15114	94,462,500
259	250	854.4875	809.4875		8718	54,487,500	15118	94,487,500
260	251	854.5125	809.5125		8722	54,512,500	15122	94,512,500
261	252	854.5375	809.5375		8726	54,537,500	15126	94,537,500
262	253	854.5625	809.5625		8730	54,562,500	15130	94,562,500
263	254	854.5875	809.5875		8734	54,587,500	15134	94,587,500
264	255	854.6125	809.6125		8738	54,612,500	15138	94,612,500
265	256	854.6375	809.6375		8742	54,637,500	15142	94,637,500
266	257	854.6625	809.6625		8746	54,662,500	15146	94,662,500
267	258	854.6875	809.6875		8750	54,687,500	15150	94,687,500
268	259	854.7125	809.7125		8754	54,712,500	15154	94,712,500
269	260	854.7375	809.7375		8758	54,737,500	15158	94,737,500
Interleave FCC channels 261-470 (EFJ channels 270 -479)								
270	261	854.7625	809.7625		8762	54,762,500	15162	94,762,500
271	262	854.7875	809.7875		8766	54,787,500	15166	94,787,500
272	263	854.8125	809.8125		8770	54,812,500	15170	94,812,500
273	264	854.8375	809.8375		8774	54,837,500	15174	94,837,500
274	265	854.8625	809.8625		8778	54,862,500	15178	94,862,500
275	266	854.8875	809.8875		8782	54,887,500	15182	94,887,500
276	267	854.9125	809.9125		8786	54,912,500	15186	94,912,500
277	268	854.9375	809.9375		8790	54,937,500	15190	94,937,500
278	269	854.9625	809.9625		8794	54,962,500	15194	94,962,500
279	270	854.9875	809.9875		8798	54,987,500	15198	94,987,500
280	271	855.0125	810.0125		8802	55,012,500	15202	95,012,500
281	272	855.0375	810.0375		8806	55,037,500	15206	95,037,500
282	273	855.0625	810.0625		8810	55,062,500	15210	95,062,500
283	274	855.0875	810.0875		8814	55,087,500	15214	95,087,500
284	275	855.1125	810.1125		8818	55,112,500	15218	95,112,500
285	276	855.1375	810.1375		8822	55,137,500	15222	95,137,500
286	277	855.1625	810.1625		8826	55,162,500	15226	95,162,500
287	278	855.1875	810.1875		8830	55,187,500	15230	95,187,500
288	279	855.2125	810.2125		8834	55,212,500	15234	95,212,500

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
289	280	855.2375	810.2375		8838	55,237,500	15238	95,237,500
290	281	855.2625	810.2625		8842	55,262,500	15242	95,262,500
291	282	855.2875	810.2875		8846	55,287,500	15246	95,287,500
292	283	855.3125	810.3125		8850	55,312,500	15250	95,312,500
293	284	855.3375	810.3375		8854	55,337,500	15254	95,337,500
294	285	855.3625	810.3625		8858	55,362,500	15258	95,362,500
295	286	855.3875	810.3875		8862	55,387,500	15262	95,387,500
296	287	855.4125	810.4125		8866	55,412,500	15266	95,412,500
297	288	855.4375	810.4375		8870	55,437,500	15270	95,437,500
298	289	855.4625	810.4625		8874	55,462,500	15274	95,462,500
299	290	855.4875	810.4875		8878	55,487,500	15278	95,487,500
300	291	855.5125	810.5125		8882	55,512,500	15282	95,512,500
301	292	855.5375	810.5375		8886	55,537,500	15286	95,537,500
302	293	855.5625	810.5625		8890	55,562,500	15290	95,562,500
303	294	855.5875	810.5875		8894	55,587,500	15294	95,587,500
304	295	855.6125	810.6125		8898	55,612,500	15298	95,612,500
305	296	855.6375	810.6375		8902	55,637,500	15302	95,637,500
306	297	855.6625	810.6625		8906	55,662,500	15306	95,662,500
307	298	855.6875	810.6875		8910	55,687,500	15310	95,687,500
308	299	855.7125	810.7125		8914	55,712,500	15314	95,712,500
309	300	855.7375	810.7375		8918	55,737,500	15318	95,737,500
310	301	855.7625	810.7625		8922	55,762,500	15322	95,762,500
311	302	855.7875	810.7875		8926	55,787,500	15326	95,787,500
312	303	855.8125	810.8125		8930	55,812,500	15330	95,812,500
313	304	855.8375	810.8375		8934	55,837,500	15334	95,837,500
314	305	855.8625	810.8625		8938	55,862,500	15338	95,862,500
315	306	855.8875	810.8875		8942	55,887,500	15342	95,887,500
316	307	855.9125	810.9125		8946	55,912,500	15346	95,912,500
317	308	855.9375	810.9375		8950	55,937,500	15350	95,937,500
318	309	855.9625	810.9625		8954	55,962,500	15354	95,962,500
319	310	855.9875	810.9875		8958	55,987,500	15358	95,987,500
320	311	856.0125	811.0125		8962	56,012,500	15362	96,012,500
321	312	856.0375	811.0375		8966	56,037,500	15366	96,037,500
322	313	856.0625	811.0625		8970	56,062,500	15370	96,062,500
323	314	856.0875	811.0875		8974	56,087,500	15374	96,087,500
324	315	856.1125	811.1125		8978	56,112,500	15378	96,112,500
325	316	856.1375	811.1375		8982	56,137,500	15382	96,137,500
326	317	856.1625	811.1625		8986	56,162,500	15386	96,162,500

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
327	318	856.1875	811.1875		8990	56,187,500	15390	96,187,500
328	319	856.2125	811.2125		8994	56,212,500	15394	96,212,500
329	320	856.2375	811.2375		8998	56,237,500	15398	96,237,500
330	321	856.2625	811.2625		9002	56,262,500	15402	96,262,500
331	322	856.2875	811.2875		9006	56,287,500	15406	96,287,500
332	323	856.3125	811.3125		9010	56,312,500	15410	96,312,500
333	324	856.3375	811.3375		9014	56,337,500	15414	96,337,500
334	325	856.3625	811.3625		9018	56,362,500	15418	96,362,500
335	326	856.3875	811.3875		9022	56,387,500	15422	96,387,500
336	327	856.4125	811.4125		9026	56,412,500	15426	96,412,500
337	328	856.4375	811.4375		9030	56,437,500	15430	96,437,500
338	329	856.4625	811.4625		9034	56,462,500	15434	96,462,500
339	330	856.4875	811.4875		9038	56,487,500	15438	96,487,500
340	331	856.5125	811.5125		9042	56,512,500	15442	96,512,500
341	332	856.5375	811.5375		9046	56,537,500	15446	96,537,500
342	333	856.5625	811.5625		9050	56,562,500	15450	96,562,500
343	334	856.5875	811.5875		9054	56,587,500	15454	96,587,500
344	335	856.6125	811.6125		9058	56,612,500	15458	96,612,500
345	336	856.6375	811.6375		9062	56,637,500	15462	96,637,500
346	337	856.6625	811.6625		9066	56,662,500	15466	96,662,500
347	338	856.6875	811.6875		9070	56,687,500	15470	96,687,500
348	339	856.7125	811.7125		9074	56,712,500	15474	96,712,500
349	340	856.7375	811.7375		9078	56,737,500	15478	96,737,500
350	341	856.7625	811.7625		9082	56,762,500	15482	96,762,500
351	342	856.7875	811.7875		9086	56,787,500	15486	96,787,500
352	343	856.8125	811.8125		9090	56,812,500	15490	96,812,500
353	344	856.8375	811.8375		9094	56,837,500	15494	96,837,500
354	345	856.8625	811.8625		9098	56,862,500	15498	96,862,500
355	346	856.8875	811.8875		9102	56,887,500	15502	96,887,500
356	347	856.9125	811.9125		9106	56,912,500	15506	96,912,500
357	348	856.9375	811.9375		9110	56,937,500	15510	96,937,500
358	349	856.9625	811.9625		9114	56,962,500	15514	96,962,500
359	350	856.9875	811.9875		9118	56,987,500	15518	96,987,500
360	351	857.0125	812.0125		9122	57,012,500	15522	97,012,500
361	352	857.0375	812.0375		9126	57,037,500	15526	97,037,500
362	353	857.0625	812.0625		9130	57,062,500	15530	97,062,500
363	354	857.0875	812.0875		9134	57,087,500	15534	97,087,500
364	355	857.1125	812.1125		9138	57,112,500	15538	97,112,500

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
365	356	857.1375	812.1375		9142	57,137,500	15542	97,137,500
366	357	857.1625	812.1625		9146	57,162,500	15546	97,162,500
367	358	857.1875	812.1875		9150	57,187,500	15550	97,187,500
368	359	857.2125	812.2125		9154	57,212,500	15554	97,212,500
369	360	857.2375	812.2375		9158	57,237,500	15558	97,237,500
370	361	857.2625	812.2625		9162	57,262,500	15562	97,262,500
371	362	857.2875	812.2875		9166	57,287,500	15566	97,287,500
372	363	857.3125	812.3125		9170	57,312,500	15570	97,312,500
373	364	857.3375	812.3375		9174	57,337,500	15574	97,337,500
374	365	857.3625	812.3625		9178	57,362,500	15578	97,362,500
375	366	857.3875	812.3875		9182	57,387,500	15582	97,387,500
376	367	857.4125	812.4125		9186	57,412,500	15586	97,412,500
377	368	857.4375	812.4375		9190	57,437,500	15590	97,437,500
378	369	857.4625	812.4625		9194	57,462,500	15594	97,462,500
379	370	857.4875	812.4875		9198	57,487,500	15598	97,487,500
380	371	857.5125	812.5125		9202	57,512,500	15602	97,512,500
381	372	857.5375	812.5375		9206	57,537,500	15606	97,537,500
382	373	857.5625	812.5625		9210	57,562,500	15610	97,562,500
383	374	857.5875	812.5875		9214	57,587,500	15614	97,587,500
384	375	857.6125	812.6125		9218	57,612,500	15618	97,612,500
385	376	857.6375	812.6375		9222	57,637,500	15622	97,637,500
386	377	857.6625	812.6625		9226	57,662,500	15626	97,662,500
387	378	857.6875	812.6875		9230	57,687,500	15630	97,687,500
388	379	857.7125	812.7125		9234	57,712,500	15634	97,712,500
389	380	857.7375	812.7375		9238	57,737,500	15638	97,737,500
390	381	857.7625	812.7625		9242	57,762,500	15642	97,762,500
391	382	857.7875	812.7875		9246	57,787,500	15646	97,787,500
392	383	857.8125	812.8125		9250	57,812,500	15650	97,812,500
393	384	857.8375	812.8375		9254	57,837,500	15654	97,837,500
394	385	857.8625	812.8625		9258	57,862,500	15658	97,862,500
395	386	857.8875	812.8875		9262	57,887,500	15662	97,887,500
396	387	857.9125	812.9125		9266	57,912,500	15666	97,912,500
397	388	857.9375	812.9375		9270	57,937,500	15670	97,937,500
398	389	857.9625	812.9625		9274	57,962,500	15674	97,962,500
399	390	857.9875	812.9875		9278	57,987,500	15678	97,987,500
400	391	858.0125	813.0125		9282	58,012,500	15682	98,012,500
401	392	858.0375	813.0375		9286	58,037,500	15686	98,037,500
402	393	858.0625	813.0625		9290	58,062,500	15690	98,062,500

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
403	394	858.0875	813.0875		9294	58,087,500	15694	98,087,500
404	395	858.1125	813.1125		9298	58,112,500	15698	98,112,500
405	396	858.1375	813.1375		9302	58,137,500	15702	98,137,500
406	397	858.1625	813.1625		9306	58,162,500	15706	98,162,500
407	398	858.1875	813.1875		9310	58,187,500	15710	98,187,500
408	399	858.2125	813.2125		9314	58,212,500	15714	98,212,500
409	400	858.2375	813.2375		9318	58,237,500	15718	98,237,500
410	401	858.2625	813.2625		9322	58,262,500	15722	98,262,500
411	402	858.2875	813.2875		9326	58,287,500	15726	98,287,500
412	403	858.3125	813.3125		9330	58,312,500	15730	98,312,500
413	404	858.3375	813.3375		9334	58,337,500	15734	98,337,500
414	405	858.3625	813.3625		9338	58,362,500	15738	98,362,500
415	406	858.3875	813.3875		9342	58,387,500	15742	98,387,500
416	407	858.4125	813.4125		9346	58,412,500	15746	98,412,500
417	408	858.4375	813.4375		9350	58,437,500	15750	98,437,500
418	409	858.4625	813.4625		9354	58,462,500	15754	98,462,500
419	410	858.4875	813.4875		9358	58,487,500	15758	98,487,500
420	411	858.5125	813.5125		9362	58,512,500	15762	98,512,500
421	412	858.5375	813.5375		9366	58,537,500	15766	98,537,500
422	413	858.5625	813.5625		9370	58,562,500	15770	98,562,500
423	414	858.5875	813.5875		9374	58,587,500	15774	98,587,500
424	415	858.6125	813.6125		9378	58,612,500	15778	98,612,500
425	416	858.6375	813.6375		9382	58,637,500	15782	98,637,500
426	417	858.6625	813.6625		9386	58,662,500	15786	98,662,500
427	418	858.6875	813.6875		9390	58,687,500	15790	98,687,500
428	419	858.7125	813.7125		9394	58,712,500	15794	98,712,500
429	420	858.7375	813.7375		9398	58,737,500	15798	98,737,500
430	421	858.7625	813.7625		9402	58,762,500	15802	98,762,500
431	422	858.7875	813.7875		9406	58,787,500	15806	98,787,500
432	423	858.8125	813.8125		9410	58,812,500	15810	98,812,500
433	424	858.8375	813.8375		9414	58,837,500	15814	98,837,500
434	425	858.8625	813.8625		9418	58,862,500	15818	98,862,500
435	426	858.8875	813.8875		9422	58,887,500	15822	98,887,500
436	427	858.9125	813.9125		9426	58,912,500	15826	98,912,500
437	428	858.9375	813.9375		9430	58,937,500	15830	98,937,500
438	429	858.9625	813.9625		9434	58,962,500	15834	98,962,500
439	430	858.9875	813.9875		9438	58,987,500	15838	98,987,500
440	431	859.0125	814.0125		9442	59,012,500	15842	99,012,500

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
441	432	859.0375	814.0375		9446	59,037,500	15846	99,037,500
442	433	859.0625	814.0625		9450	59,062,500	15850	99,062,500
443	434	859.0875	814.0875		9454	59,087,500	15854	99,087,500
444	435	859.1125	814.1125		9458	59,112,500	15858	99,112,500
445	436	859.1375	814.1375		9462	59,137,500	15862	99,137,500
446	437	859.1625	814.1625		9466	59,162,500	15866	99,162,500
447	438	859.1875	814.1875		9470	59,187,500	15870	99,187,500
448	439	859.2125	814.2125		9474	59,212,500	15874	99,212,500
449	440	859.2375	814.2375		9478	59,237,500	15878	99,237,500
450	441	859.2625	814.2625		9482	59,262,500	15882	99,262,500
451	442	859.2875	814.2875		9486	59,287,500	15886	99,287,500
452	443	859.3125	814.3125		9490	59,312,500	15890	99,312,500
453	444	859.3375	814.3375		9494	59,337,500	15894	99,337,500
454	445	859.3625	814.3625		9498	59,362,500	15898	99,362,500
455	446	859.3875	814.3875		9502	59,387,500	15902	99,387,500
456	447	859.4125	814.4125		9506	59,412,500	15906	99,412,500
457	448	859.4375	814.4375		9510	59,437,500	15910	99,437,500
458	449	859.4625	814.4625		9514	59,462,500	15914	99,462,500
459	450	859.4875	814.4875		9518	59,487,500	15918	99,487,500
460	451	859.5125	814.5125		9522	59,512,500	15922	99,512,500
461	452	859.5375	814.5375		9526	59,537,500	15926	99,537,500
462	453	859.5625	814.5625		9530	59,562,500	15930	99,562,500
463	454	859.5875	814.5875		9534	59,587,500	15934	99,587,500
464	455	859.6125	814.6125		9538	59,612,500	15938	99,612,500
465	456	859.6375	814.6375		9542	59,637,500	15942	99,637,500
466	457	859.6625	814.6625		9546	59,662,500	15946	99,662,500
467	458	859.6875	814.6875		9550	59,687,500	15950	99,687,500
468	459	859.7125	814.7125		9554	59,712,500	15954	99,712,500
469	460	859.7375	814.7375		9558	59,737,500	15958	99,737,500
470	461	859.7625	814.7625		9562	59,762,500	15962	99,762,500
471	462	859.7875	814.7875		9566	59,787,500	15966	99,787,500
472	463	859.8125	814.8125		9570	59,812,500	15970	99,812,500
473	464	859.8375	814.8375		9574	59,837,500	15974	99,837,500
474	465	859.8625	814.8625		9578	59,862,500	15978	99,862,500
475	466	859.8875	814.8875		9582	59,887,500	15982	99,887,500
476	467	859.9125	814.9125		9586	59,912,500	15986	99,912,500
477	468	859.9375	814.9375		9590	59,937,500	15990	99,937,500
478	469	859.9625	814.9625		9594	59,962,500	15994	99,962,500

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
479	470	859.9875	814.9875		9598	59,987,500	15998	99,987,500
Expansion band FCC 471-510 (EFJ 480 - 519)								
480	471	860.0125	815.0125		9602	60,012,500	16002	100,012,500
481	472	860.0375	815.0375		9606	60,037,500	16006	100,037,500
482	473	860.0625	815.0625		9610	60,062,500	16010	100,062,500
483	474	860.0875	815.0875		9614	60,087,500	16014	100,087,500
484	475	860.1125	815.1125		9618	60,112,500	16018	100,112,500
485	476	860.1375	815.1375		9622	60,137,500	16022	100,137,500
486	477	860.1625	815.1625		9626	60,162,500	16026	100,162,500
487	478	860.1875	815.1875		9630	60,187,500	16030	100,187,500
488	479	860.2125	815.2125		9634	60,212,500	16034	100,212,500
489	480	860.2375	815.2375		9638	60,237,500	16038	100,237,500
490	481	860.2625	815.2625		9642	60,262,500	16042	100,262,500
491	482	860.2875	815.2875		9646	60,287,500	16046	100,287,500
492	483	860.3125	815.3125		9650	60,312,500	16050	100,312,500
493	484	860.3375	815.3375		9654	60,337,500	16054	100,337,500
494	485	860.3625	815.3625		9658	60,362,500	16058	100,362,500
495	486	860.3875	815.3875		9662	60,387,500	16062	100,387,500
496	487	860.4125	815.4125		9666	60,412,500	16066	100,412,500
497	488	860.4375	815.4375		9670	60,437,500	16070	100,437,500
498	489	860.4625	815.4625		9674	60,462,500	16074	100,462,500
499	490	860.4875	815.4875		9678	60,487,500	16078	100,487,500
500	491	860.5125	815.5125		9682	60,512,500	16082	100,512,500
501	492	860.5375	815.5375		9686	60,537,500	16086	100,537,500
502	493	860.5625	815.5625		9690	60,562,500	16090	100,562,500
503	494	860.5875	815.5875		9694	60,587,500	16094	100,587,500
504	495	860.6125	815.6125		9698	60,612,500	16098	100,612,500
505	496	860.6375	815.6375		9702	60,637,500	16102	100,637,500
506	497	860.6625	815.6625		9706	60,662,500	16106	100,662,500
507	498	860.6875	815.6875		9710	60,687,500	16110	100,687,500
508	499	860.7125	815.7125		9714	60,712,500	16114	100,712,500
509	500	860.7375	815.7375		9718	60,737,500	16118	100,737,500
510	501	860.7625	815.7625		9722	60,762,500	16122	100,762,500
511	502	860.7875	815.7875		9726	60,787,500	16126	100,787,500
512	503	860.8125	815.8125		9730	60,812,500	16130	100,812,500
513	504	860.8375	815.8375		9734	60,837,500	16134	100,837,500
514	505	860.8625	815.8625		9738	60,862,500	16138	100,862,500
515	506	860.8875	815.8875		9742	60,887,500	16142	100,887,500

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
516	507	860.9125	815.9125		9746	60,912,500	16146	100,912,500
517	508	860.9375	815.9375		9750	60,937,500	16150	100,937,500
518	509	860.9625	815.9625		9754	60,962,500	16154	100,962,500
519	510	860.9875	815.9875		9758	60,987,500	16158	100,987,500
Guard band: FCC channels 511 - 550 (EFJ channels 520 - 559)								
520	511	861.0125	816.0125		9762	61,012,500	16162	101,012,500
521	512	861.0375	816.0375		9766	61,037,500	16166	101,037,500
522	513	861.0625	816.0625		9770	61,062,500	16170	101,062,500
523	514	861.0875	816.0875		9774	61,087,500	16174	101,087,500
524	515	861.1125	816.1125		9778	61,112,500	16178	101,112,500
525	516	861.1375	816.1375		9782	61,137,500	16182	101,137,500
526	517	861.1625	816.1625		9786	61,162,500	16186	101,162,500
527	518	861.1875	816.1875		9790	61,187,500	16190	101,187,500
528	519	861.2125	816.2125		9794	61,212,500	16194	101,212,500
529	520	861.2375	816.2375		9798	61,237,500	16198	101,237,500
530	521	861.2625	816.2625		9802	61,262,500	16202	101,262,500
531	522	861.2875	816.2875		9806	61,287,500	16206	101,287,500
532	523	861.3125	816.3125		9810	61,312,500	16210	101,312,500
533	524	861.3375	816.3375		9814	61,337,500	16214	101,337,500
534	525	861.3625	816.3625		9818	61,362,500	16218	101,362,500
535	526	861.3875	816.3875		9822	61,387,500	16222	101,387,500
536	527	861.4125	816.4125		9826	61,412,500	16226	101,412,500
537	528	861.4375	816.4375		9830	61,437,500	16230	101,437,500
538	529	861.4625	816.4625		9834	61,462,500	16234	101,462,500
539	530	861.4875	816.4875		9838	61,487,500	16238	101,487,500
540	531	861.5125	816.5125		9842	61,512,500	16242	101,512,500
541	532	861.5375	816.5375		9846	61,537,500	16246	101,537,500
542	533	861.5625	816.5625		9850	61,562,500	16250	101,562,500
543	534	861.5875	816.5875		9854	61,587,500	16254	101,587,500
544	535	861.6125	816.6125		9858	61,612,500	16258	101,612,500
545	536	861.6375	816.6375		9862	61,637,500	16262	101,637,500
546	537	861.6625	816.6625		9866	61,662,500	16266	101,662,500
547	538	861.6875	816.6875		9870	61,687,500	16270	101,687,500
548	539	861.7125	816.7125		9874	61,712,500	16274	101,712,500
549	540	861.7375	816.7375		9878	61,737,500	16278	101,737,500
550	541	861.7625	816.7625		9882	61,762,500	16282	101,762,500
551	542	861.7875	816.7875		9886	61,787,500	16286	101,787,500
552	543	861.8125	816.8125		9890	61,812,500	16290	101,812,500

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.3 Full Reband Channels

EFJ Channel ID	FCC Channel Number	Rx Freq	Tx Freq	Tx Ref Number	800MHz Rx Ref Number	800MHz Rx offset	7/800 Rx Ref Number	7/800 Rx Offset
553	544	861.8375	816.8375		9894	61,837,500	16294	101,837,500
554	545	861.8625	816.8625		9898	61,862,500	16298	101,862,500
555	546	861.8875	816.8875		9902	61,887,500	16302	101,887,500
556	547	861.9125	816.9125		9906	61,912,500	16306	101,912,500
557	548	861.9375	816.9375		9910	61,937,500	16310	101,937,500
558	549	861.9625	816.9625		9914	61,962,500	16314	101,962,500
559	550	861.9875	816.9875		9918	61,987,500	16318	101,987,500

1 ReBand 1 Rx Ref base: Mutual Aid Ch 5kdev 25KHz space

2 Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.4 NPSPAC channels

EFJ ¹ Channel ID	FCC ² Channel Number	Rx Freq	Tx Freq
1	1	851.0125	806.0125
2	na	851.0250	806.0250
3	2	851.0375	806.0375
4	3	851.0500	806.0500
5	4	851.0625	806.0625
6	5	851.0750	806.0750
7	6	851.0875	806.0875
8	7	851.1000	806.1000
9	8	851.1125	806.1125
10	9	851.1250	806.1250
11	10	851.1375	806.1375
12	11	851.1500	806.1500
13	12	851.1625	806.1625
14	13	851.1750	806.1750
15	14	851.1875	806.1875
16	15	851.2000	806.2000
17	16	851.2125	806.2125
18	17	851.2250	806.2250
19	18	851.2375	806.2375
20	19	851.2500	806.2500

¹ EFJ channels 1- 239 are numbered continuously and include the 5 Mutual Aid channels the FCC table skips. EFJ channels 2, 40, 42, 80,82, 120,122, 160,162 are not assigned in the NPSPAC band.

² Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.4 NPSPAC channels

EFJ ¹ Channel ID	FCC ² Channel Number	Rx Freq	Tx Freq
21	20	851.2625	806.2625
22	21	851.2750	806.2750
23	22	851.2875	806.2875
24	23	851.3000	806.3000
25	24	851.3125	806.3125
26	25	851.3250	806.3250
27	26	851.3375	806.3375
28	27	851.3500	806.3500
29	28	851.3625	806.3625
30	29	851.3750	806.3750
31	30	851.3875	806.3875
32	31	851.4000	806.4000
33	32	851.4125	806.4125
34	33	851.4250	806.4250
35	34	851.4375	806.4375
36	35	851.4500	806.4500
37	36	851.4625	806.4625
38	37	851.4750	806.4750
39	38	851.4875	806.4875
40	na	851.5000	806.5000
41	39	851.5125	806.5125
42	na	851.5250	806.5250

¹ EFJ channels 1- 239 are numbered continuously and include the 5 Mutual Aid channels the FCC table skips. EFJ channels 2, 40, 42, 80,82, 120,122, 160,162 are not assigned in the NPSPAC band.

² Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.4 NPSPAC channels

EFJ ¹ Channel ID	FCC ² Channel Number	Rx Freq	Tx Freq
43	40	851.5375	806.5375
44	41	851.5500	806.5500
45	42	851.5625	806.5625
46	43	851.5750	806.5750
47	44	851.5875	806.5875
48	45	851.6000	806.6000
49	46	851.6125	806.6125
50	47	851.6250	806.6250
51	48	851.6375	806.6375
52	49	851.6500	806.6500
53	50	851.6625	806.6625
54	51	851.6750	806.6750
55	52	851.6875	806.6875
56	53	851.7000	806.7000
57	54	851.7125	806.7125
58	55	851.7250	806.7250
59	56	851.7375	806.7375
60	57	851.7500	806.7500
61	58	851.7625	806.7625
62	59	851.7750	806.7750
63	60	851.7875	806.7875
64	61	851.8000	806.8000
65	62	851.8125	806.8125
66	63	851.8250	806.8250
67	64	851.8375	806.8375
68	65	851.8500	806.8500
69	66	851.8625	806.8625
70	67	851.8750	806.8750
71	68	851.8875	806.8875
72	69	851.9000	806.9000
73	70	851.9125	806.9125
74	71	851.9250	806.9250
75	72	851.9375	806.9375
76	73	851.9500	806.9500
77	74	851.9625	806.9625
78	75	851.9750	806.9750

¹ EFJ channels 1- 239 are numbered continuously and include the 5 Mutual Aid channels the FCC table skips.

EFJ channels 2, 40, 42, 80,82, 120,122, 160,162 are not assigned in the NPSPAC band.

² Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.4 NPSPAC channels

EFJ ¹ Channel ID	FCC ² Channel Number	Rx Freq	Tx Freq
79	76	851.9875	806.9875
80	na	852.0000	807.0000
81	77	852.0125	807.0125
82	na	852.0250	807.0250
83	78	852.0375	807.0375
84	79	852.0500	807.0500
85	80	852.0625	807.0625
86	81	852.0750	807.0750
87	82	852.0875	807.0875
88	83	852.1000	807.1000
89	84	852.1125	807.1125
90	85	852.1250	807.1250
91	86	852.1375	807.1375
92	87	852.1500	807.1500
93	88	852.1625	807.1625
94	89	852.1750	807.1750
95	90	852.1875	807.1875
96	91	852.2000	807.2000
97	92	852.2125	807.2125
98	93	852.2250	807.2250
99	94	852.2375	807.2375
100	95	852.2500	807.2500
101	96	852.2625	807.2625
102	97	852.2750	807.2750
103	98	852.2875	807.2875
104	99	852.3000	807.3000
105	100	852.3125	807.3125
106	101	852.3250	807.3250
107	102	852.3375	807.3375
108	103	852.3500	807.3500
109	104	852.3625	807.3625
110	105	852.3750	807.3750
111	106	852.3875	807.3875
112	107	852.4000	807.4000
113	108	852.4125	807.4125
114	109	852.4250	807.4250

¹ EFJ channels 1- 239 are numbered continuously and include the 5 Mutual Aid channels the FCC table skips.

EFJ channels 2, 40, 42, 80,82, 120,122, 160,162 are not assigned in the NPSPAC band.

² Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.4 NPSPAC channels

EFJ ¹ Channel ID	FCC ² Channel Number	Rx Freq	Tx Freq
115	110	852.4375	807.4375
116	111	852.4500	807.4500
117	112	852.4625	807.4625
118	113	852.4750	807.4750
119	114	852.4875	807.4875
120	na	852.5000	807.5000
121	115	852.5125	807.5125
122	na	852.5250	807.5250
123	116	852.5375	807.5375
124	117	852.5500	807.5500
125	118	852.5625	807.5625
126	119	852.5750	807.5750
127	120	852.5875	807.5875
128	121	852.6000	807.6000
129	122	852.6125	807.6125
130	123	852.6250	807.6250
131	124	852.6375	807.6375
132	125	852.6500	807.6500
133	126	852.6625	807.6625
134	127	852.6750	807.6750
135	128	852.6875	807.6875
136	129	852.7000	807.7000
137	130	852.7125	807.7125
138	131	852.7250	807.7250
139	132	852.7375	807.7375
140	133	852.7500	807.7500
141	134	852.7625	807.7625
142	135	852.7750	807.7750
143	136	852.7875	807.7875
144	137	852.8000	807.8000
145	138	852.8125	807.8125
146	139	852.8250	807.8250
147	140	852.8375	807.8375
148	141	852.8500	807.8500
149	142	852.8625	807.8625
150	143	852.8750	807.8750

¹ EFJ channels 1- 239 are numbered continuously and include the 5 Mutual Aid channels the FCC table skips.

EFJ channels 2, 40, 42, 80,82, 120,122, 160,162 are not assigned in the NPSPAC band.

² Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.4 NPSPAC channels

EFJ ¹ Channel ID	FCC ² Channel Number	Rx Freq	Tx Freq
151	144	852.8875	807.8875
152	145	852.9000	807.9000
153	146	852.9125	807.9125
154	147	852.9250	807.9250
155	148	852.9375	807.9375
156	149	852.9500	807.9500
157	150	852.9625	807.9625
158	151	852.9750	807.9750
159	152	852.9875	807.9875
160	na	853.0000	808.0000
161	153	853.0125	808.0125
162	na	853.0250	808.0250
163	154	853.0375	808.0375
164	155	853.0500	808.0500
165	156	853.0625	808.0625
166	157	853.0750	808.0750
167	158	853.0875	808.0875
168	159	853.1000	808.1000
169	160	853.1125	808.1125
170	161	853.1250	808.1250
171	162	853.1375	808.1375
172	163	853.1500	808.1500
173	164	853.1625	808.1625
174	165	853.1750	808.1750
175	166	853.1875	808.1875
176	167	853.2000	808.2000
177	168	853.2125	808.2125
178	169	853.2250	808.2250
179	170	853.2375	808.2375
180	171	853.2500	808.2500
181	172	853.2625	808.2625
182	173	853.2750	808.2750
183	174	853.2875	808.2875
184	175	853.3000	808.3000
185	176	853.3125	808.3125
186	177	853.3250	808.3250

¹ EFJ channels 1- 239 are numbered continuously and include the 5 Mutual Aid channels the FCC table skips.

EFJ channels 2, 40, 42, 80,82, 120,122, 160,162 are not assigned in the NPSPAC band.

² Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.4 NPSPAC channels

EFJ ¹ Channel ID	FCC ² Channel Number	Rx Freq	Tx Freq
187	178	853.3375	808.3375
188	179	853.3500	808.3500
189	180	853.3625	808.3625
190	181	853.3750	808.3750
191	182	853.3875	808.3875
192	183	853.4000	808.4000
193	184	853.4125	808.4125
194	185	853.4250	808.4250
195	186	853.4375	808.4375
196	187	853.4500	808.4500
197	188	853.4625	808.4625
198	189	853.4750	808.4750
199	190	853.4875	808.4875
200	191	853.5000	808.5000
201	192	853.5125	808.5125
202	193	853.5250	808.5250
203	194	853.5375	808.5375
204	195	853.5500	808.5500
205	196	853.5625	808.5625
206	197	853.5750	808.5750
207	198	853.5875	808.5875
208	199	853.6000	808.6000
209	200	853.6125	808.6125
210	201	853.6250	808.6250
211	202	853.6375	808.6375
212	203	853.6500	808.6500
213	204	853.6625	808.6625
214	205	853.6750	808.6750
215	206	853.6875	808.6875
216	207	853.7000	808.7000
217	208	853.7125	808.7125
218	209	853.7250	808.7250
219	210	853.7375	808.7375
220	211	853.7500	808.7500
221	212	853.7625	808.7625
222	213	853.7750	808.7750

¹ EFJ channels 1- 239 are numbered continuously and include the 5 Mutual Aid channels the FCC table skips. EFJ channels 2, 40, 42, 80,82, 120,122, 160,162 are not assigned in the NPSPAC band.

² Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.4 NPSPAC channels

EFJ ¹ Channel ID	FCC ² Channel Number	Rx Freq	Tx Freq
223	214	853.7875	808.7875
224	215	853.8000	808.8000
225	216	853.8125	808.8125
226	217	853.8250	808.8250
227	218	853.8375	808.8375
228	219	853.8500	808.8500
229	220	853.8625	808.8625
230	221	853.8750	808.8750
231	222	853.8875	808.8875
232	223	853.9000	808.9000
233	224	853.9125	808.9125
234	225	853.9250	808.9250
235	226	853.9375	808.9375
236	227	853.9500	808.9500
237	228	853.9625	808.9625
238	229	853.9750	808.9750
239	230	853.9875	808.9875

¹ EFJ channels 1- 239 are numbered continuously and include the 5 Mutual Aid channels the FCC table skips. EFJ channels 2, 40, 42, 80,82, 120,122, 160,162 are not assigned in the NPSPAC band.

² Rebanded NPSPAC range 3 MHz: FCC channels 1-229 (851.012 - 854.9875) are 12.5KHz spaced except for 5 Mutual Aid channels that are 25KHz spaced.

Table 18.5 PSCII channels

EFJ Channel ID	FCC Channel Number	Tx Freq	Rx Freq
240	231	854.0125	809.0125
241	232	854.0375	809.0375
242	233	854.0625	809.0625
243	234	854.0875	809.0875
244	235	854.1125	809.1125
245	236	854.1375	809.1375
246	237	854.1625	809.1625
247	238	854.1875	809.1875
248	239	854.2125	809.2125
249	240	854.2375	809.2375
250	241	854.2625	809.2625
251	242	854.2875	809.2875
252	243	854.3125	809.3125

Table 18.5 PSCII channels

EFJ Channel ID	FCC Channel Number	Tx Freq	Rx Freq
253	244	854.3375	809.3375
254	245	854.3625	809.3625
255	246	854.3875	809.3875
256	247	854.4125	809.4125
257	248	854.4375	809.4375
258	249	854.4625	809.4625
259	250	854.4875	809.4875
260	251	854.5125	809.5125
261	252	854.5375	809.5375
262	253	854.5625	809.5625
263	254	854.5875	809.5875
264	255	854.6125	809.6125
265	256	854.6375	809.6375
266	257	854.6625	809.6625
267	258	854.6875	809.6875
268	259	854.7125	809.7125
269	260	854.7375	809.7375

Table 18.6 Interleaved channels

FCC Channel #	EFJ Channel ID	Tx Freq	Rx Freq
261	270	854.7625	809.7625
262	271	854.7875	809.7875
263	272	854.8125	809.8125
264	273	854.8375	809.8375
265	274	854.8625	809.8625
266	275	854.8875	809.8875
267	276	854.9125	809.9125
268	277	854.9375	809.9375
269	278	854.9625	809.9625
270	279	854.9875	809.9875
271	280	855.0125	810.0125
272	281	855.0375	810.0375
273	282	855.0625	810.0625
274	283	855.0875	810.0875
275	284	855.1125	810.1125
276	285	855.1375	810.1375
277	286	855.1625	810.1625
278	287	855.1875	810.1875

Table 18.6 Interleaved channels (continued)

FCC Channel #	EFJ Channel ID	Tx Freq	Rx Freq
279	288	855.2125	810.2125
280	289	855.2375	810.2375
281	290	855.2625	810.2625
282	291	855.2875	810.2875
283	292	855.3125	810.3125
284	293	855.3375	810.3375
285	294	855.3625	810.3625
286	295	855.3875	810.3875
287	296	855.4125	810.4125
288	297	855.4375	810.4375
289	298	855.4625	810.4625
290	299	855.4875	810.4875
291	300	855.5125	810.5125
292	301	855.5375	810.5375
293	302	855.5625	810.5625
294	303	855.5875	810.5875
295	304	855.6125	810.6125
296	305	855.6375	810.6375
297	306	855.6625	810.6625
298	307	855.6875	810.6875
299	308	855.7125	810.7125
300	309	855.7375	810.7375
301	310	855.7625	810.7625
302	311	855.7875	810.7875
303	312	855.8125	810.8125
304	313	855.8375	810.8375
305	314	855.8625	810.8625
306	315	855.8875	810.8875
307	316	855.9125	810.9125
308	317	855.9375	810.9375
309	318	855.9625	810.9625
310	319	855.9875	810.9875
311	320	856.0125	811.0125
312	321	856.0375	811.0375
313	322	856.0625	811.0625
314	323	856.0875	811.0875
315	324	856.1125	811.1125
316	325	856.1375	811.1375
317	326	856.1625	811.1625
318	327	856.1875	811.1875

Table 18.6 Interleaved channels (continued)

FCC Channel #	EFJ Channel ID	Tx Freq	Rx Freq
319	328	856.2125	811.2125
320	329	856.2375	811.2375
321	330	856.2625	811.2625
322	331	856.2875	811.2875
323	332	856.3125	811.3125
324	333	856.3375	811.3375
325	334	856.3625	811.3625
326	335	856.3875	811.3875
327	336	856.4125	811.4125
328	337	856.4375	811.4375
329	338	856.4625	811.4625
330	339	856.4875	811.4875
331	340	856.5125	811.5125
332	341	856.5375	811.5375
333	342	856.5625	811.5625
334	343	856.5875	811.5875
335	344	856.6125	811.6125
336	345	856.6375	811.6375
337	346	856.6625	811.6625
338	347	856.6875	811.6875
339	348	856.7125	811.7125
340	349	856.7375	811.7375
341	350	856.7625	811.7625
342	351	856.7875	811.7875
343	352	856.8125	811.8125
344	353	856.8375	811.8375
345	354	856.8625	811.8625
346	355	856.8875	811.8875
347	356	856.9125	811.9125
348	357	856.9375	811.9375
349	358	856.9625	811.9625
350	359	856.9875	811.9875
351	360	857.0125	812.0125
352	361	857.0375	812.0375
353	362	857.0625	812.0625
354	363	857.0875	812.0875
355	364	857.1125	812.1125
356	365	857.1375	812.1375
357	366	857.1625	812.1625
358	367	857.1875	812.1875
359	368	857.2125	812.2125

Table 18.6 Interleaved channels (continued)

FCC Channel #	EFJ Channel ID	Tx Freq	Rx Freq
360	369	857.2375	812.2375
361	370	857.2625	812.2625
362	371	857.2875	812.2875
363	372	857.3125	812.3125
364	373	857.3375	812.3375
365	374	857.3625	812.3625
366	375	857.3875	812.3875
367	376	857.4125	812.4125
368	377	857.4375	812.4375
369	378	857.4625	812.4625
370	379	857.4875	812.4875
371	380	857.5125	812.5125
372	381	857.5375	812.5375
373	382	857.5625	812.5625
374	383	857.5875	812.5875
375	384	857.6125	812.6125
376	385	857.6375	812.6375
377	386	857.6625	812.6625
378	387	857.6875	812.6875
379	388	857.7125	812.7125
380	389	857.7375	812.7375
381	390	857.7625	812.7625
382	391	857.7875	812.7875
383	392	857.8125	812.8125
384	393	857.8375	812.8375
385	394	857.8625	812.8625
386	395	857.8875	812.8875
387	396	857.9125	812.9125
388	397	857.9375	812.9375
389	398	857.9625	812.9625
390	399	857.9875	812.9875
391	400	858.0125	813.0125
392	401	858.0375	813.0375
393	402	858.0625	813.0625
394	403	858.0875	813.0875
395	404	858.1125	813.1125
396	405	858.1375	813.1375
397	406	858.1625	813.1625
398	407	858.1875	813.1875
399	408	858.2125	813.2125
400	409	858.2375	813.2375

Table 18.6 Interleaved channels (continued)

FCC Channel #	EFJ Channel ID	Tx Freq	Rx Freq
401	410	858.2625	813.2625
402	411	858.2875	813.2875
403	412	858.3125	813.3125
404	413	858.3375	813.3375
405	414	858.3625	813.3625
406	415	858.3875	813.3875
407	416	858.4125	813.4125
408	417	858.4375	813.4375
409	418	858.4625	813.4625
410	419	858.4875	813.4875
411	420	858.5125	813.5125
412	421	858.5375	813.5375
413	422	858.5625	813.5625
414	423	858.5875	813.5875
415	424	858.6125	813.6125
416	425	858.6375	813.6375
417	426	858.6625	813.6625
418	427	858.6875	813.6875
419	428	858.7125	813.7125
420	429	858.7375	813.7375
421	430	858.7625	813.7625
422	431	858.7875	813.7875
423	432	858.8125	813.8125
424	433	858.8375	813.8375
425	434	858.8625	813.8625
426	435	858.8875	813.8875
427	436	858.9125	813.9125
428	437	858.9375	813.9375
429	438	858.9625	813.9625
430	439	858.9875	813.9875
431	440	859.0125	814.0125
432	441	859.0375	814.0375
433	442	859.0625	814.0625
434	443	859.0875	814.0875
435	444	859.1125	814.1125
436	445	859.1375	814.1375
437	446	859.1625	814.1625
438	447	859.1875	814.1875
439	448	859.2125	814.2125
440	449	859.2375	814.2375

Table 18.6 Interleaved channels (continued)

FCC Channel #	EFJ Channel ID	Tx Freq	Rx Freq
441	450	859.2625	814.2625
442	451	859.2875	814.2875
443	452	859.3125	814.3125
444	453	859.3375	814.3375
445	454	859.3625	814.3625
446	455	859.3875	814.3875
447	456	859.4125	814.4125
448	457	859.4375	814.4375
449	458	859.4625	814.4625
450	459	859.4875	814.4875
451	460	859.5125	814.5125
452	461	859.5375	814.5375
453	462	859.5625	814.5625
454	463	859.5875	814.5875
455	464	859.6125	814.6125
456	465	859.6375	814.6375
457	466	859.6625	814.6625
458	467	859.6875	814.6875
459	468	859.7125	814.7125
460	469	859.7375	814.7375
461	470	859.7625	814.7625
462	471	859.7875	814.7875
463	472	859.8125	814.8125
464	473	859.8375	814.8375
465	474	859.8625	814.8625
466	475	859.8875	814.8875
467	476	859.9125	814.9125
468	477	859.9375	814.9375
469	478	859.9625	814.9625
470	479	859.9875	814.9875

Table 18.7 Expansion Channels

EFJ Channel ID	FCC Channel Number	Tx Freq	Rx Freq
480	471	860.0125	815.0125
481	472	860.0375	815.0375
482	473	860.0625	815.0625
483	474	860.0875	815.0875
484	475	860.1125	815.1125

Table 18.7 Expansion Channels (continued)

EFJ Channel ID	FCC Channel Number	Tx Freq	Rx Freq
485	476	860.1375	815.1375
486	477	860.1625	815.1625
487	478	860.1875	815.1875
488	479	860.2125	815.2125
489	480	860.2375	815.2375
490	481	860.2625	815.2625
491	482	860.2875	815.2875
492	483	860.3125	815.3125
493	484	860.3375	815.3375
494	485	860.3625	815.3625
495	486	860.3875	815.3875
496	487	860.4125	815.4125
497	488	860.4375	815.4375
498	489	860.4625	815.4625
499	490	860.4875	815.4875
500	491	860.5125	815.5125
501	492	860.5375	815.5375
502	493	860.5625	815.5625
503	494	860.5875	815.5875
504	495	860.6125	815.6125
505	496	860.6375	815.6375
506	497	860.6625	815.6625
507	498	860.6875	815.6875
508	499	860.7125	815.7125
509	500	860.7375	815.7375
510	501	860.7625	815.7625
511	502	860.7875	815.7875
512	503	860.8125	815.8125
513	504	860.8375	815.8375
514	505	860.8625	815.8625
515	506	860.8875	815.8875
516	507	860.9125	815.9125
517	508	860.9375	815.9375
518	509	860.9625	815.9625
519	510	860.9875	815.9875

Table 18.8 Guard Channels

EFJ Channel ID	FCC Channel Number	Tx Freq	Rx Freq
520	511	861.0125	816.0125
521	512	861.0375	816.0375
522	513	861.0625	816.0625
523	514	861.0875	816.0875
524	515	861.1125	816.1125
525	516	861.1375	816.1375
526	517	861.1625	816.1625
527	518	861.1875	816.1875
528	519	861.2125	816.2125
529	520	861.2375	816.2375
530	521	861.2625	816.2625
531	522	861.2875	816.2875
532	523	861.3125	816.3125
533	524	861.3375	816.3375
534	525	861.3625	816.3625
535	526	861.3875	816.3875
536	527	861.4125	816.4125
537	528	861.4375	816.4375
538	529	861.4625	816.4625
539	530	861.4875	816.4875
540	531	861.5125	816.5125
541	532	861.5375	816.5375
542	533	861.5625	816.5625
543	534	861.5875	816.5875
544	535	861.6125	816.6125
545	536	861.6375	816.6375
546	537	861.6625	816.6625
547	538	861.6875	816.6875
548	539	861.7125	816.7125
549	540	861.7375	816.7375
550	541	861.7625	816.7625
551	542	861.7875	816.7875
552	543	861.8125	816.8125
553	544	861.8375	816.8375
554	545	861.8625	816.8625
555	546	861.8875	816.8875
556	547	861.9125	816.9125
557	548	861.9375	816.9375

Table 18.8 Guard Channels

EFJ Channel ID	FCC Channel Number	Tx Freq	Rx Freq
558	549	861.9625	816.9625
559	550	861.9875	816.9875



Updating Your Radio

Programming data for Series 51xx portable radios and 53xx mobile radios is stored in a file that can be saved, read, copied, and deleted. This file automatically receives the extension *.rcf*. Refer to Section 3.1.

A.1 Identifying the Type of Radio



WARNING

It is extremely crucial to know what type of radio is to be upgraded before starting the upgrade process.

There are two ways to check the radio type.

5100 Portable Radios

- 1 Turn on the radio and check the displayed version number at power up.
 - a Non-SEM version radios have a S/W version 1.xx.xx displayed.
 - b SEM version radios have S/W version 2.x.x displayed.
 - c UCM version radios have S/W version 3.x.x displayed.
 - d X Platform radios have S/W version 4.x.x displayed.
 - e Series 6 radios have S/W version 6.x.x displayed.
- 2 Use PC Configure to read the version information.
 - a With radio programming cables attached and radio powered on, Select **Transfer → Read Version Info**.
 - b In the Controller Version the software number is displayed.
 - o A 1.x.xx number indicates a NON-SEM version.
 - o A 2.x.x number indicates an SEM version.
 - o A 3.x.x number indicates a UCM version radio.
 - o 4.x.x indicates the X platform radios.

- 6.x.x indicates ES radios.

53xx Mobiles Radios

- 1 Turn on the radio and check the displayed version number at power up.
 - a ARM/DSP version radios have a S/W version 1.xx.xx displayed.
 - b SEM version radios have S/W version 2.x.x displayed.
 - c UCM version radios have S/W version 3.x.x displayed.
 - d X Platform radios have S/W version 4.x.x displayed.
 - e Series 6 radios have S/W version 6.x.x displayed.
- 2 Use PC Configure to read the version information.
 - a With radio programming cables attached and radio powered on, **Select Transfer → Read Version Info.**
 - b In the Controller Version the software number is displayed.
 - A 1.x.xx number indicates an ARM/DSP version.
 - A 2.x.x number indicates an SEM version.
 - A 3.x.x number indicates a UCM version radio.
 - A 4.x.x indicates the X platform radios.
 - 6.x.x indicates ES radios.

A.2 .rcf File Conversions

5100 and 5300 Flash Codes

- 5100 portables and 5300 mobiles with 4.6.x or later versions use PC Configure 2.1.0 or later.
- PC Configure 2.4.x supports software versions for the 1.x.x, 2.x.x and 3.x.x branches. Users are required to upgrade software in earlier version radios to match the 5.9 file format supported by PC Configure 2.4.x.

1.2.1 Uploading RCF from 4.4.x Radio

The following process provides the steps to save a working RCF from a radio with a 05.2 build application code:

- 1 Open PC Configure 1.28.08.
- 2 Read (upload) RCF profile from radio.
- 3 Save RCF profile to your PC hard drive. Placing 05.2 in the file name is recommended.

1.2.2 Downloading RCF to 4.4.x Radio

The following process provides the steps to write a working RCF back to a radio with 05.2 build application code:

- 1 Open PC Configure 1.28.08.
- 2 Open RCF file compatible with 4.4.x app code. (Placing 05.2 in the file name is recommended.)
- 3 Write (download) the RCF to the radio.

1.2.3 Copying RCF from 4.4.x Radio to 4.6.x Radio

The following process provides the steps to write a working RCF from a 05.2 application code into a radio with 06.1 build application code radio:

- 1 Open PCC 2.1.0 or higher.
- 2 Open RCF file saved to hard drive with 05.2 file format.

Note *Do **not** save over the 4.4.x saved file. Archive all .rcf files: Once a 4.4.x RCF file is saved/opened with 4.6.x PCC, it cannot be opened by a 4.4.x PCC.*

- 3 Download file to radio with 4.6.x application code.
- 4 PCC reformats the file and the radio operates normally.

If radio software has been upgraded from 4.4.x to 4.6.x:

- 1 Download file to radio with 4.6.x application code.
- 2 PCC reformats the file and the radio operates normally.

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